Table 1
Nkamouna Environmental and Social Assessment
Air Emission Limits for General Application

Pollutant or Parameter	Limit (milligrams per normal cubic meter)
Particulate Matter (PM)	50 for units with greater than or equal to 50 megawatts electricity (Mwe) input; 100 for units with less than 50 Mwe input
Nitrogen oxides (as NO_2)	
Oil-Fired	460 (130 nanograms/joule)
Gas-Fired	320 (86 nanograms/joule)
Sulfur dioxide	Not to exceed 2,000

Source: WBG, Pollution Prevention and Abatement Handbook, July 1998

Table 2
Nkamouna Environmental and Social Assessment
Ambient Air Conditions Outside the Property Boundary

Pollutant	**Concentration (micrograms per cubic meter, $\mu m/m^3$)**
Particulate Matter (<10 µm)	
Annual Arithmetic Mean	100
Maximum 24-hour Average	500
Nitrogen Oxides, as NO_2	
Annual Arithmetic Mean	100
Maximum 24-hour Average	200
Sulfur Dioxide	
Annual Arithmetic Mean	100
Maximum 24-hour Average	500

Source: World Bank Environment, Health, and Safety Guidelines, Mining and Milling - Open Pit, August 1995

Table 3
Nkamouna Environmental and Social Assessment
Guidelines for Tailings Impoundments, Mine Drainage, Sedimentation Basin, Sewage Systems, and Stormwater Discharged to Surface Waters

Parameter	Limit	Parameter	Limit
PH	6 to 9	Temperature	3 - 5° C[b]
BOD_5	50 mg/L	Oil and Grease	20 mg/L
Total Suspended Solids	50 mg/L	Arsenic	1.0 mg/L
Cadmium	0.1 mg/L	Copper	0.3 mg/L
Chromium		Iron, Total	2 mg/L
Hexavalent	0.05 mg/L		
Total	1.0 mg/L		
Lead	0.6 mg/L	Mercury	0.002 mg/L
Nickel	0.5 mg/L	Zinc	1.0 mg/L

a These guidelines do not apply to direct discharge of tailings to marine environments

[b] Maximum 5°C above ambient temperatures of receiving waters or maximum 3°C if receiving waters greater than 28°C.

Source: WBG, Mining and Milling – Open Pit

Table 4
Nkamouna Environmental and Social Assessment
Analytical Parameters for Water Monitoring Program

Test Analyte/Parameter	Units	Rationale [1]	WHO Guidelines Or Derived Action Levels
BULK PROPERTIES			
PH	pH Units	a,b,c	6.5 – 9.5 (*)
Electrical Conductivity @ 25°C	µS/cm	b,c	1500 [3]
Total Dissolved Solids (grav) @ 180°C	mg/L	a,b,c	1000 (*)
Total Alkalinity as $CaCO_3$ [2]	mg/L	c	
Acidity as $CaCO_3$	mg/L	b,c	
MAJOR/MINOR CATIONS			
Sodium, Na	mg/L	a,c	200 (*)
Potassium, K	mg/L	c	
Calcium, Ca	mg/L	c	
Magnesium, Mg	mg/L	c	
Iron, Fe (Soluble)	mg/L	a,b,c	0.3 (*)
MAJOR/MINOR ANIONS			
Chloride, Cl^-	mg/L	a,c	250 (*)
Sulphate, $SO_4^=$	mg/L	a,b,c	250 (*)
Nitrate-Nitrite	mg/L	a,b	50 [4]
Fluoride, F^-	mg/L	a,b,c	1.5
Cyanide (total)	mg/L	a, d	0.07
Total Phosphate	mg/L	b, d	
TRACE METALS			
Antimony, Sb	mg/L	a	0.005
Aluminum, Al	mg/L	a	0.2 (*)
Arsenic, As	mg/L	a	0.01
Barium, Ba	mg/L	a	0.7
Beryllium, Be	mg/L	a	NAD
Cadmium, Cd	mg/L	a	0.003
Chromium, Cr	mg/L	a	0.05
Copper, Cu	mg/L	a	2 1(*)
Mercury, Hg	mg/L	a	0.001
Manganese, Mn	mg/L	a	0.5 0.1 (*)
Nickel, Ni	mg/L	a	0.02
Lead, Pb	mg/L	a	0.01
Selenium, Se	mg/L	a	0.01
Thallium, Tl	mg/L	a	0.002 (**)
Zinc, Zn	mg/L	a	3 (*)
Uranium, U	mg/L	a,b	NAD
ORGANIC CONSTITUENTS			
Total Petroleum Hydrocarbons by IR(screening)	µg/L	b	DET[1]
TRH C_6-C_9	µg/L	b	DET[1]
Organochlorine Pesticides and PCBs	µg/L	b	DET[1]
Total Organic Carbon	mg/L	c	
RADIOACTIVITY			
Gross Alpha	Bq/L	a,b	0.1
Gross Beta	Bq/L	a,b	1

Table 4
Nkamouna Environmental and Social Assessment
Explanatory Notes

NAD = no adequate data to permit recommendation of a health-based guideline value
DET[1] = An action level is generally set at the detection limit for these constituents because of their likely indication of direct anthropogenic contamination. Following a detection, a confirmatory sample should be collected and the situation assessed.
DET[2] = Must not be detectable in any 100 ml sample

[1] Rationale for inclusion of parameter in monitoring program
a) WHO lists these as "Chemicals of health significance in drinking-water. Guidelines have been specified by WHO or other applicable human-health oriented organization.
Source of WHO information is Guidelines for Drinking-Water Quality (2nd ed.), Vol. 1 Recommendations (1993); Vol. 2 Health Criteria and Other Supporting Information (1996); and Vol. 3 Surveillance and Control of Community Supplies (1997)
b) Parameter may provide indication of contributions by mining-related activities and/or unsanitary human habitation and contamination.
c) Parameter is required for overall understanding of major water quality, and/or treatment design.
d) Parameter may indicate contamination from non-mining industrial/agricultural activities.
[2] To be determined only if field or laboratory pH is approximately 5.0 or greater.
[3] An electrical conductivity (EC) of 1500 µS/cm is approximately equivalent to 1000 mg/L total dissolved solids. An EC action level is provided because of its ease of field measurement.
[4] WHO specifies a guideline for nitrate as NO_3^- and nitrite as NO_2^- equal to 50 and 3 mg/L, respectively. In addition, WHO specifies that the sum of the ratio of each concentration to its guideline value should not exceed 1.0. However, nitrogen species (nitrate and nitrite) are very difficult to determine separately due to short holding times for unpreserved samples (24 hours). Typically, water samples for soluble nitrogen determinations are preserved with sulfuric acid which precludes the separate determination of nitrite. Acidified samples are normally treated with a reducing agent that converts all nitrate to nitrite and the resultant total nitrite is measured. Results are reported as "nitrate + nitrite as NO3-". Because nitrite is an intermediate species in the conversion for nitrate + nitrite. to or from nitrate, it is perhaps less likely to occur in significant concentrations than nitrate. As a result, the WHO guideline for nitrate is recommended here as the action level
(*) "Secondary" guideline value above which use of water may give rise to complaints by consumers. In the case of pH, a values <8 is required for effective disinfection by chlorination and optimal pHs are generally within the range stated.
(**) A guideline is not provided by WHO. Values shown is MCL for U.S. drinking water.

Table 5
Nkamouna Environmental and Social Assessment
Noise Limits

	Maximum allowable log equivalent (hourly measurements), in dB(A)	
Receptor	**Day (07:00-22:00)**	**Night (22:00-07:00)**
Residential	55 dB(A)	45 dB(A)
Industrial	70 dB(A)	70 dB(A)

Source: WBG, Pollution Prevention and Abatement Handbook, July 1998

Table 6
Nkamouna Environmental and Social Assessment
Employee Breakdown

Department	Number of Employees	% of Workforce
Yaoundé Office	40	9.6%
Administration	35	8.4%
Environment H&S	15	3.6%
Technical Services	25	6.0%
Mining	100	24.1%
Physical upgrade plant	35	8.4%
Leach Plant	100	24.1%
Engineering/Maintenance	65	15.7%
Total	415	100.0%

Table 7
Nkamouna Environmental and Social Assessment
Transported Material Volumes and Truck Numbers

Material	Source	Annual Quantity x 1000	
		Tonnes	Liters
To site:			
Sulfur	Import	21	
Sulfuric acid	Produce on site		2,550
Lime/Limestone or Soda Ash	Import or Local Import	23 35	
Hydrochloric acid	Import		250
SX Reagents	Import		15
Diesel Fuel - Plant	Domestic		3,880
Diesel Fuel - Mine	Domestic		6,056
Gasoline	Domestic		208
	Sub-Totals	44 to 56	12,959
Truck Totals To site:			
Truck loads/year @ 20 t/load		2,200 to 2,850	650
Average truck loads/day		7.8	1.8
From site:			
Cobalt Oxide		5	
Nickel Oxide		3	
Manganese Oxide		34	
Sub-Totals		42	
Truck Totals From site:			
Truck loads/year @ 20 t/load		2,100	
Average truck loads/day		5.8	

Table 8
Nkamouna Environmental and Social Assessment
Anticipated Project Footprints
(A) = Annual Disturbance (L) = Long Term Disturbance

	4,000 T Cobalt/Yr		8,000 T Cobalt/Yr		Total Project	
	Disturbance (hectares)	Reclaimed (hectares)	Disturbance (hectares)	Reclaimed (hectares)	Disturbance (hectares)	Reclaimed (hectares)
MINE:						
Pit (A)	30	20	60	45	660	660
Haul Roads (L)	2	0	4	0	10	10
Stream Diversions (L)	2	0	3	0	3	3
Waste Dumps (L)	5	0	10	0	30	30
Ore Stockpiles (L)	1	0	2	0	3	3
Service/Repair Shops (L)	2	0	2	0	3	3
PROCESS PLANT:						
PUG & Leach Circuits (L)	20	0	20	0	20	20
Napene Tailing Storage (L)	70	0	70	0	200	200
WATER SYSTEMS:						
Process Pipelines (L)	5	0	5	0	5	5
Fresh Water Pipelines (L)	2	0	2	0	3	3
INFRASTRUCTURE:						
Expatriate Village (L)	10	0	10	0	10	10
Sewage Leach Field (L)	1	0	1	0	2	2
Service Roads (L)	5	0	5	0	8	8
Electricity Distribution (L)	2	0	2	0	5	5
Aggregate Stockpile (L)	1	0	1	0	2	2
Solid Waste Disposal (L)	1	0	1	0	2	2
Airplane Landing Strip (L)	20	0	20	0	20	20
CONSTRUCTION:						
Contractor Camp (A)	3	3	3	3	3	3
Construction Laydown (A)	3	3	3	3	3	3
TOTAL (hectares)	**185**	**26**	**224**	**51**	**992**	**992**
Net Unreclaimed/Year		**159**		**173**		**0**

The Nkamouna project could possibly disturb 1,350 hectares if additional resources are mined and if the project is expanded to largest extent foreseeable.

Table 9
Nkamouna Environmental and Social Impact Assessment
Major Mining Equipment

Description	Number
Loader/Excavator, 4-8 cubic meter	4
Haul trucks – 35 to 50 tonne	7
Tree skidders	2
Logging trucks	1
Log loaders	1
Farm tractor	1
Road Grader – 4.5-meter mold board	1
Bulldozers	3
Rough Terrain Crane - 40-tonne	1
Water Truck - 10,000 gallon	1
Service /Fuel Truck	1
Rough terrain Forklift	1
Mechanic Boom Truck	2
Pickup Trucks and Vans	12

Table 10
Nkamouna Environmental and Social Impact Assessment
Average Monthly Precipitation

Month	Nkamouna Project Site (mm)	Lomié Townsite (mm)	Kongo Base Camp (mm)	Kongo School (mm)	Ndu (mm)	Average (mm)
January	18	30.3	8	7.7	48.5	22.5
February	64	46.6	61	47	60.8	55.9
March	157.2	138.3	193	198	202	177.7
April	235	164.2	136	243	267	209.1
May	230	213.2	124.7	252	269	217.8
June	102	143.8	137	151	152	137.2
July	190.3	117.6	228	153	168.5	171.5
August	158.3	132.7	108.2	155.5	217.5	154.4
September	278	217.5	199.4	276.5	235.8	241.4
October	119.3	273.3	190	226.7	186.7	199.2
November	144.4	128.3	156.7	151	165	149.1
December	30.7	34	28.7	29	27.3	29.9
Totals	1,727.00	1,639.90	1,570.60	1,890.40	2,000.10	1,765.60

Table 11
Nkamouna Environmental and Social Impact Assessment
Monthly Temperature (°C)

Months	Kongo Base Camp			Kongo School			Lomie			Nkamouna				
	Monthly Range		Monthly Average	Monthly Range		Monthly Average	Monthly Range		Monthly Average	Monthly Range		Monthly Average	Monthly R	
	Avg Max	Avg Min		Avg Max	Avg Min		Avg Max	Avg Min		Avg Max	Avg Min		Avg Max	
January	39	15	27	38	13	26	33	13	23	34	12	23	37	
February	36	15	26	/	/	/	34	15	25	39	14	27	41	
March	36	18	27	/	/	/	37	18	28	38	18	28	40	
April	37	20	28	/	/	/	38	20	29	38	19	29	40	
May	36	20	28	/	/	/	35	18	27	36	18	27	38	
June	35	19	27	38	17	27	34	19	27	34	18	26	37	
July	38	19	28	36	16	26	32	18	25	34	18	26	33	
August	32	20	26	34	18	26	34	20	27	33	19	26	33	
September	35	19	27	36	18	27	34	18	26	35	18	26	41	
October	35	21	28	37	19	28	37	21	29	37	19	28	33	
November	37	19	28	32	19	25	30	19	25	30	18	24	29	
December	37	17	27	32	16	24	29	17	23	29	15	22	29	
Averages	**36**	**18**	**27**	**35**	**17**	**26**	**34**	**18**	**26**	**35**	**17**	**26**	**36**	

Table 12
Nkamouna Environmental and Social Impact Assessment
Humidity (%)

Months	Kongo Base Camp			Lomié			Nkamouna			Ndu		
	Monthly Range		Monthly Average	Monthly Range		Monthly Average	Monthly Range		Monthly Average	Monthly Range		Monthly Average
	Max	Min		Max	Min		Max	Min		Max	Min	
January	100	19	71.5	/	/	/	98	27	73.2	82	60	77.9
February	98	20	59	/	/	/	82	33	64.8	/	/	/
March	98	20	60.1	/	/	/	84	42	68.8	/	/	/
April	98	26	62.4	/	/	/	84	42	68.1	/	/	/
May	98	26	62	/	/	/	82	46	69.6	/	/	/
June	98	26	63.6	94	49	76.3	82	52	72.4	/	/	/
July	100	45	80	94	50	77.7	98	51	81.3	82	70	78
August	100	45	81.6	94	50	77.3	98	45	83.3	82	66	76.6
September	100	51	80.1	100	46	76.7	98	46	79.7	84	60	73.9
October	93	44	76.7	97	45	74.4	98	46	77.7	83	66	78
November	92	40	75.9	/	/	/	98	47	80.7	86	71	79.7
December	92	10	67.6	93	15	69.7	98	49	82.2	88	62	78.1
Average	97.3	31	70.1	95.3	42.5	75.4	91.7	43.8	75.2	83.9	65	77.5

Table 13
Nkamouna Environmental and Social Impact Assessment
Evaporation

Month	2004 Evaporation (mm)	2004 Rainfall (mm)	Net Evaporation (mm)
January	160	0	160
February	212	46	166
March	216	65	151
April	207	228	-21
May	158	268	-110
June	133	127	6
July	162	259	-97
August	170	215	-45
September	132	166	-34
October	123	257	-134
November	128	142	-14
December	150	47	103
TOTAL	1,951	1,820.00	131

Table 14
Nkamouna Environmental and Social Impact Assessment
Average Wind Speed

Month	Kongo Base Camp		Lomié		Monthly Average
	Average Speed	Dominant Direction	Average Speed	Dominant Direction	
January	3.4	N	/	/	3.4
February	4	W	/	/	4
March	5	S	/	/	5
April	4.8	S	/	/	4.8
May	4.4	W/SW	/	/	4.4
June	4.2	S	5.17	S	4.7
July	3.7	S	5.64	S	4.7
August	4.4	SW	5.16	W	4.8
September	3	S	5.7	S	4.4
October	4	S	5.9	N	5
November	1	NW	/	/	1
December	4	SW	/	/	4
Average Speed	**3.8**		**5.51**		**4.2**

Table 15
Nkamouna Environmental and Social Impact Assessment
URS Soil and Subsurface Samples

	Sample Number	NKS-SS-01-00	NKW-SS-02-00	NKW-SP-02-00	NKW-SP-03-00	NKS-SB-01-04	NKW-SB-02-02	NKS-SB-01-16	NKW-
	Sample type	Surface soil	Surface soil	Surface soil	Surface soil	Overburden	Overburden	Mineralized	Min
	Depth Interval	0 to 0.15	0 to 0.15	0 to 0.15	0 to 0.15	4 to 5	2 to 3	16 to 17	17
	Sample Date	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	20-Dec-00	20-Dec-00	20-Dec-00	20-I
Analytical Parameter	**Units**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**R**
Dissolved TAL Metals									
Aluminum	mg/kg	53900	55200	25200	50700	30400	31700	8450	1
Antimony	mg/kg	3.4	4.7	2.7	4.4			4.6	
Arsenic	mg/kg	6.6	8.9		18.2	9.6	9.1	5.4	
Barium	mg/kg			10.2		5.3		50.8	
Beryllium	mg/kg								
Cadmium	mg/kg	2	1.8		2.1				
Calcium	mg/kg								
Chromium	mg/kg	1880	1800	1570	2630	1920	1430	2680	2
Cobalt	mg/kg	20.6	18.2	37.9	52.2	108	41.7	913	
Copper	mg/kg	16.8	11.6	14.1	19.5	17.8	8.2	130	
Iron	mg/kg	158000	154000	69800	173000	123000	102000	187000	1
Lead	mg/kg	13.4	13.2	7.9	11.0	13.5	10.5	3.4	
Magnesium	mg/kg	320	301	591	496	205	174	344	
Manganese	mg/kg	536	470	130	669	1130	589	6510	7
Mercury	mg/kg	0.094	0.099	0.073	0.081		0.052	0.06	0
Nickel	mg/kg	567	537	440	775	589	388	4050	3
Potassium	mg/kg								
Selenium	mg/kg								
Silver	mg/kg								
Sodium	mg/kg								
Thallium	mg/kg								
Zinc	mg/kg	19.1	17	32.9	24	18.3	12.1	106	

Nkamouna Environmental and Social Impact Assessment
URS Soil and Subsurface Samples

	Sample Number	NKS-SS-01-00	NKW-SS-02-00	NKW-SP-02-00	NKW-SP-03-00	NKS-SB-01-04	NKW-SB-02-02	NKS-SB-01-16	NKW-
	Sample type	Surface soil	Surface soil	Surface soil	Surface soil	Overburden	Overburden	Mineralized	Min
	Depth Interval	0 to 0.15	0 to 0.15	0 to 0.15	0 to 0.15	4 to 5	2 to 3	16 to 17	17
	Sample Date	22-Nov-00	22-Nov-00	22-Nov-00	22-Nov-00	20-Dec-00	20-Dec-00	20-Dec-00	20-I
Analytical Parameter	**Units**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**R**
Acid-Base Accounting Parameters									
CEC	meq/100g	27.1	29.4	38.8	23.7	14.5	14.3	16.6	
Eh	mV	180	141	193	422	264	278	325	
pH	SI	4.42	4.15	4.29	4.19	6.01	5.53	6.20	
Total Sulfur, S	%	na	na	na	na	0.01	0.05	0.02	
Sulfur-Total	$tCaCO_3$/1000t	na	na	na	na	0.31	1.56	0.63	
Pyritic Sulfur,S	%	na	na	na	na				
S-Pyritic-Perox	$tCaCO_3$/1000t	na	na	na	na				
Sulfate Sulfur,S	%	na	na	na	na				
Sulfur-Unident	%	na	na	na	na	0.01	0.05	0.02	
APP/Peroxide	%	na	na	na	na				
APP-Peroxide	$tCaCO_3$/1000t	na	na	na	na				
Acid Neut. Pot.	$tCaCO_3$/1000t	na	na	na	na	0.5	2.5	0.5	

m-bgs	meters below ground surface	%	percent
mg/kg	milligrams per kilogram	tCaCO3/1000t	tons of calcium carbonate per 1000 tons of material
CEC	cation exchange capacity	APP	
Eh	electropotential	ANP	acid neutralizing potential
meq/100g	milliequivalents per 100 grams	ND	not detected
mV	millivolts	NV	no concentration range values given
SI	standard international units		

Table 16
Nkamouna Environmental and Social Impact Assessment
Surface and Ground Water Chemistry

Sample ID	1 NKM Tail Area S	2 Manour	3 Mwa Ekaha	4 Edje u/s	5 Napene	6 East NKM	7 Kongo Village	8 Kongo Base Camp
Date Sampled	6/16/2004	6/16/2004	6/16/2004	6/17/2004	6/17/2004	6/17/2004	6/17/2004	6/16/2004
Time Sampled	12:07	15:30	17:00	11:45	13:30	15:00	17:45	18:45
Physical Tests								
Conductivity (uS/cm)	71.1	110	85.1	25.1	80.4	68.0	81.7	352
Fixed Dissolved Solids	12	44	37	14	26	33	22	187
Total Dissolved Solids	-	-	-	-	-	-	-	-
Hardness CaCO3	-	-	-	-	-	-	-	-
pH	7.74	7.97	7.84	7.09	7.80	7.73	7.16	7.98
Total Suspended Solids	-	-	-	-	-	-	-	-
Dissolved Anions								
Alkalinity-Total CaCO3	39.2	62.1	48.6	11.2	45.3	38.4	40.7	197
Bromide Br	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride Cl	0.66	<0.50	0.54	<0.50	0.55	0.53	<0.50	2.25
Fluoride F	0.030	<0.020	<0.020	0.032	<0.020	<0.020	0.041	0.079
Sulphate SO4	0.66	<0.50	<0.50	1.32	<0.50	<0.50	1.10	2.07
Nutrients								
Nitrite/Nitrate Nitrogen N	0.383	0.747	0.462	0.244	0.314	0.277	0.967	0.027
Total Metals								
Aluminum T-Al	0.0975	0.0161	0.0221	1.72	0.0769	0.115	0.0079	0.0016
Antimony T-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic T-As	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010
Barium T-Ba	0.0161	0.00941	0.0122	0.0374	0.00934	0.0140	0.0202	0.0258
Beryllium T-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth T-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron T-B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium T-Cd	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Calcium T-Ca	2.19	0.966	1.22	1.53	1.68	1.52	9.32	51.5
Chromium T-Cr	0.00425	0.0209	0.0159	0.00677	0.0180	0.0119	<0.00050	<0.00050
Cobalt T-Co	0.00025	0.00148	0.00085	0.00322	0.00100	0.00099	0.00056	<0.00010
Copper T-Cu	0.00050	0.00079	0.00076	0.00360	0.00083	0.00094	0.0177	0.00069
Iron T-Fe	0.594	0.135	0.160	3.18	0.372	0.635	<0.030	0.702
Lead T-Pb	0.000081	0.000091	0.000149	0.00108	0.000213	0.000409	0.000089	0.000073
Lithium T-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0095
Magnesium T-Mg	7.15	13.0	9.86	1.40	8.68	7.29	2.36	9.91

Nkamouna Environmental and Social Impact Assessment
Surface and Ground Water Chemistry

Sample ID	1 NKM TailArea	2 Manour	3 Mwa Ekaha	4 Edje u/s	5 Napene	6 East NKM	7 Kongo Village	8 Kongo Base Camp
Manganese T-Mn	0.00731	0.00735	0.00722	0.135	0.0154	0.0133	0.287	0.259
Molybdenum T-Mo	<0.000050	<0.000050	<0.000050	0.000087	<0.000050	<0.000050	<0.000050	<0.000050
Nickel T-Ni	0.0398	0.112	0.0839	0.00975	0.0755	0.0632	0.00083	<0.00050
Phosphorus T-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium T-K	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium T-Se	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silicon T-Si	8.70	9.86	8.34	5.06	6.99	7.24	9.22	14.5
Silver T-Ag	<0.000010	0.000068	0.000016	0.000020	0.000035	0.000011	<0.000010	<0.000010
Sodium T-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	7.0
Strontium T-Sr	0.0102	0.00551	0.00591	0.0122	0.00606	0.00767	0.0588	0.282
Thallium T-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin T-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium T-Ti	<0.010	<0.010	<0.010	0.036	<0.010	<0.010	<0.010	<0.010
Uranium T-U	<0.000010	<0.000010	<0.000010	0.000170	<0.000010	0.000013	<0.000010	<0.000010
Vanadium T-V	<0.0010	<0.0010	<0.0010	0.0074	<0.0010	<0.0010	<0.0010	<0.0010
Zinc T-Zn	0.0014	0.0016	0.0017	0.0084	0.0014	0.0016	0.0212	0.0072
Dissolved Metals								
Aluminum D-Al	0.0233	0.0039	0.0042	0.172	0.0355	0.0518	0.0069	<0.0010
Antimony D-Sb	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic D-As	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium D-Ba	0.0153	0.00875	0.0110	0.0203	0.00812	0.0124	0.0196	0.0248
Beryllium D-Be	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth D-Bi	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron D-B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium D-Cd	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Calcium D-Ca	2.16	1.01	1.30	1.49	1.72	1.56	9.75	54.2
Chromium D-Cr	0.00321	0.0150	0.00901	0.00092	0.0108	0.00647	<0.00050	<0.00050
Cobalt D-Co	<0.00010	0.00042	<0.00010	<0.00010	<0.00010	0.00011	0.00057	<0.00010
Copper D-Cu	0.00051	0.00017	0.00022	0.00114	0.00035	0.00050	0.0203	0.00023
Iron D-Fe	0.314	0.058	0.046	0.277	0.151	0.349	<0.030	<0.030
Lead D-Pb	0.000099	<0.000050	0.000176	0.000120	0.000270	0.000176	0.000126	<0.000050
Lithium D-Li	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0087
Magnesium D-Mg	6.97	13.5	10.4	1.36	9.16	7.46	2.49	10.6
Manganese D-Mn	0.00258	0.000548	0.000179	0.00144	0.000589	0.00122	0.294	0.232

Table 16
Nkamouna Environmental and Social Impact Assessment
Surface and Ground Water Chemistry

Sample ID	1 NKM TailArea	2 Manour	3 Mwa Ekaha	4 Edje u/s	5 Napene	6 East NKM	7 Kongo Village	8 Kongo Base Camp
Molybdenum D-Mo	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel D-Ni	0.0373	0.0920	0.0634	0.00368	0.0567	0.0483	0.00096	<0.00050
Phosphorus D-P	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium D-K	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium D-Se	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silicon D-Si	8.35	10.3	8.82	3.86	7.41	7.46	9.58	15.4
Silver D-Ag	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium D-Na	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	7.5
Strontium D-Sr	0.00992	0.00507	0.00521	0.00981	0.00553	0.00692	0.0598	0.266
Thallium D-Tl	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin D-Sn	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium D-Ti	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium D-U	<0.000010	<0.000010	<0.000010	0.000028	<0.000010	<0.000010	<0.000010	<0.000010
Vanadium D-V	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc D-Zn	<0.0020	<0.0020	<0.0020	<0.0030	<0.0020	<0.0030	0.0263	0.0104

Units ar mg/L except where noted

< = Less than the detection limit indicated.

* = No WHO value. Value indicated is the MCL for US Drinking Water

Sites 7 and 8 are groundwater samples

Table 17
Nkamouna Environmental and Social Impact Assessment
Surface Gauging Data

Months	Edje River	Manour Creek	Mwa-Ekaha Creek		Napene Creek	Ndu Pole	
	Depth (cm)	V-notch (cm)	V-notch (cm)	Pole (cm)	V-notch (cm)	Morning (cm)	Evening (cm)
January	108.4	20.4	23.8	39	29.3	28.2	28.1
Feb	102.5	18.8	22.5	28.6	28.6	27.1	26.8
March	119.2	18.9	29.4	21.7	28.8	30.3	28
April	125.4	19.1	22.6	37.9	28	35.4	30.6
May	119.6	19.2	22.3	37.9	27.8	41.8	/
June	117.3	18.9	21.9	37.9	24.4	35.1	32.1
July	107.5	19.1	21.7	36.3	27.2	34.9	/
August	81.2	18.5	22.7	36.5	28.8	34.8	/
Sept	94.8	18.9	23.4	37.3	29.3	38.7	/
Oct	128.2	21.8	25.5	37.8	29.5	42.4	/
Nov	84.6	22.2	27.3	40.5	29.1	46	/
Dec	110.3	22	26.2	40.4	32.5	38.4	31.4
Average	108.2	19.8	24.1	36	28.6	36.1	29.5

Table 18
Nkamouna Environmental and Social Impact Assessment
URS Surface Water Sampling in the Nkamouna Area

		Sample Number	NKDS-SW-01	NKN-SW-01	ERDS-SW-02	WHO
		Subbasin Location	Edje River	Edje River	Edje River	Drinking water guidelines
		Surface Flow (cms)	22.4	0.5	11	
		Sample Date	26-Nov-00	22-Nov-00	23-Nov-00	
		Sample Time	9:30	15:29	8:05	
Analytical Parameter		**Units**	**Result**	**Result**	**Result**	
Dissolved TAL Metals						
	Aluminum	mg/l	0.04		0.05	0.2
	Antimony	mg/l				0.005
	Arsenic	mg/l				0.01
	Barium	mg/l	0.015	0.009	0.018	0.7
	Beryllium	mg/l				NAD
	Cadmium	mg/l				0.003
	Calcium	mg/l	1.47	1.54	1.77	
	Chromium	mg/l		0.011		0.05
	Cobalt	mg/l				
	Copper	mg/l				2
	Iron	mg/l	0.58	0.11	0.79	0.3
	Lead	mg/l				0.01
	Magnesium	mg/l	1.67	7.97	1.96	
	Manganese	mg/l	0.028	0.014	0.029	0.5
	Mercury	mg/l				0.001
	Nickel	mg/l	0.009	0.061	0.009	0.02
	Potassium	mg/l				
	Selenium	mg/l				0.01
	Silver	mg/l				
	Sodium	mg/l	0.6	0.3	0.8	200
	Thallium	mg/l				0.002*
	Zinc	mg/l				3

Table 18
Nkamouna Environmental and Social Impact Assessment
URS Surface Water Sampling in the Nkamouna Area

	Sample Number	NKDS-SW-01	NKN-SW-01	ERDS-SW-02	WHO
Analytical Parameter	**Units**	**Result**	**Result**	**Result**	**Drinking water guidelines**
Wet Chemistry					
Total Alkalinity	mg/l	11.5	35	11.5	
Bicarbonate Alkalinity	mg/l	11.5	35	11.5	
Carbonate Alkalinity	mg/l				
Hydroxyl Alkalinity	mg/l				
Ammonia as N	mg/l	0.04	0.02	0.02	
Hardness as CaCO3	mg/l	12.1	35.3	11.9	
Calcium	mg/l	1.57	1.44	1.62	
Magnesium	mg/l	1.98	7.7	1.9	
Chloride	mg/l	0.5	0.8	0.5	250
Fluoride	mg/l				1.5
Nitrite+ Nitrate as N	mg/l	2.23	0.61	0.27	
Nitrate as Nitrogen	mg/l	0.26	0.57	0.28	
Total Phosphorous	mg/l	0.04		0.03	
Sulfate	mg/l	0.6	0.3	0.5	250
pH	SI	6.38	6.64	6.36	
Specific Conductivity	umhos/cm	26.8	70.2	27.9	
Total Dissolved Solids	mg/l	31	81		1000
Total Suspended Solids	mg/l	15	9	14	
Oil & Grease	mg/l	19	5	3.5	
Total Phenols	mg/l				
BOD-5					
Coliforms		100	1000	0	0
Ion Balance Difference	%				
Total Anions	mg/l	0.45	0.77	0.27	
Total Cations	mg/l	0.26	0.7	0.24	
Field Parameters					
pH	SI	7.34	6.96	4.97	6.5 to 9.5
Specific Conductivity	umhos/cm	108	71	69	
Salinity	%	0	0	0	
Temperature	Celsius	22.5	23	22.1	
Turbidity	Ntu	94	8	9	
Dissolved Oxygen	mg/l	8.39	6.5	10	

* = No WHO value. Value indicated is the MCL for US Drinking Water

NAD = no adequate data to permit recommendation of a health-based guideline value

Table 19
Nkamouna Environmental and Social Impact Assessment
Flora Biodiversity Values

	ST 15990	ST 2655	ST 6942	ST 7046	Transect 10104
S	96	89	83	83	105
ISH	5.68	5.45	5.54	5.63	6.01
EQ	0.86	0.84	0.86	0.88	0.89
D	29.87	25.17	30.12	31.4	42.57
D'	0.033	0.039	0.033	0.031	0.23

S = number of species

Table 20
Nkamouna Environmental and Social Impact Assessment
Flora Inventory and IUCN Status

Name	Family	IUCN Status
Afrostyrax lepidophyllus	Huaceae	VU
Afzelia sp.	Caesalpiniaceae	
Aidia micrantha	Rubiaceae	
Albizia adianthifolia	Mimosaceae	
Albizia glaberrima	Mimosaceae	
Allanblackia florinbunda	Clusiaceae	
Alstonia boonei	Apocynaceae	
Amphimas ferrugineus	Caesalpiniaceae	
Amphimas pterocarpoides	Caesalpiniaceae	
Angylocalyx pynaertii	Fabaceae	
Aningeria robusta	Sapotaceae	
Anonidium mannii	Annonaceae	
Anopyxis klaineana	Anisophylleaceae	VU
Anthonotha cladantha	Caesalpiniaceae	
Anthonotha macrophylla	Caesalpiniaceae	
Antiaris africana	Moraceae	
Antidesma laciniatum	Euphorbiaceae	
Antidesma membranaceum	Euphorbiaceae	
Antrocaryon klaineanum	Anarcadiaceae	
Aoranthe cladantha	Rubiaceae	
Aulacocalyx jasminiflora	Rubiaceae	
Autranella congolensis	Sapotaceae	CR
Baillonella toxisperma	Sapotaceae	VU
Barteria nigritana ssp. Fistulosa	Passifloraceae	
Beilschemiedia sp.	Lauraceae	
Blighia sapida	Sapindaceae	
Blighia welwitschii	Meliaceae	
Bombax brevicuspe	Bombcaceae	
Bombax buonopozense	Bombacacae	
Brenania brieyi	Rubiaceae	
Caloncoba glauca	Flacourtiaceae	
Calpocalyx dinklagei	Mimosaceae	
Canarium schweinfurtii	Burseraceae	
Carapa procera	Meliaceae	
Casearia barteri	Samydaceae	
Cavacoa quintasii	Euphorbiaceae	
Celtis tessmannii	Ulmaceae	
Celtis zenkeri	Ulmaceae	
Centroplacus glaucinus	Euphorbiaceae	
Chlamydocola chlamydantha	Sterculiaceae	
Chytranthus sp.	Sapindaceae	
Cleistopholis glauca	Annonaceae	
Cleistopholis patens	Annonaceae	
Coelocaryon preussii	Myristicaceae	
Cola lateritia	Sterculiaceae	
Cola sp.	Sterculiaceae	
Copaifera mildbreadii	Caesalpiniaceae	
Corynanthe pachyceras	Rubiaceae	

Table 20
Nkamouna Environmental and Social Impact Assessment
Flora Inventory and IUCN Status

Name	Family	IUCN Status
Dialium guineense	Caesalpiniaceae	
Dialium pachyphyllum	Caesalpiniaceae	
Dialium zenkeri	Caesalpiniaceae	
Diopyros hoyleana	Ebenaceae	
Diospyros crassiflora	Ebenaceae	EN
Diospyros hoyleana	Ebenaceae	
Discoglypremna caloneura	Euphorbiaceae	
Dracaena arborea	Dracaenaceae	
Drypetes capillipes	Euphorbiaceae	
Drypetes chevalieri	Euphorbiaceae	
Drypetes gossweileri	Euphorbiaceae	
Drypetes laciniata	Euphorbiaceae	LR/nt
Drypetes sp.	Euphorbiaceae	
Drypetes staudtii	Euphorbiaceae	
Duboscia macrocarpa	Tiliaceae	
Enantia chlorantha	Annonaceae	
Entandrophragma angolense	Meliaceae	VU
Entandrophragma candoLlei	Meliaceae	VU
EntAndrophragma cylindricum	Meliaceae	VU
EntAndrophragma utile	Meliaceae	VU
Eribroma oblongum	Sterculiaceae	VU
Eriocoelum macrocarpum	Sapindaceae	
Erismadelphus exul	Vochysiaceae	
Erythrophleum suaveolens	Caesalpiniaceae	
Erythropleum ivorense	Caesalpiniaceae	
Fagara heitzii	Rutaceae	
Fernandoa adolphi-friderici	Bignoniaceae	
Ficus mucuso	Moraceae	
Funtumia elastica	Apocynaceae	
Gambeya lacourtiana	Meliaceae	
Gambeya sp.	Sapotaceae	
Garcinia cola	Clusiaceae	
Garcinia mannii	Clusiaceae	
Gossweilerodendron balsamiferum	Caesalpiniaceae	EN
Guarea cedrata	Meliaceae	VU
Guarea thompsonii	Meliaceae	VU
Guibourtia demeusei	Caesalpiniaceae	
Heisteria paviflora	Olacaceae	
Heisteria trillesiana	Olacaceae	
Hevea brasilensis	Euphorbiaceae	
Hexalobus crispiflorus	Annonaceae	
Homalium letestui	Flacourtiaceae	
Hylodendron gabunense	Caesalpiniaceae	
Hymenocardia lyrata	Euphorbiaceae	
Indet	Bignoniaceae	
Irvingia gabonensis	Irvingiaceae	
Irvingia grandifolia	Irvingiaceae	
Keayodendron bridelioides	Euphorbiaceae	

Table 20
Nkamouna Environmental and Social Impact Assessment
Flora Inventory and IUCN Status

Name	Family	IUCN Status
Lepidobotrys staudtii	Lepidobotryaceae	
Lindackeria sp.	Flacourtiaceae	
Lovoa trichilioides	Meliaceae	VU
Macaranga preussii	Euphorbiaceae	
Macaranga sp.	Euphorbiaceae	
Macaranga spinosa	Euphorbiaceae	
Maesobotrya dusenii	Euphorbiaceae	
Maesopsis eminii	Rhamnaceae	
Mammea africana	Clusiaceae	
Manilkara argentea	Sapotaceae	
Manilkara sp.	Sapotaceae	
Maranthes glabra	Chrysobalanaceae	
Maranthes sp.	Chrysobalanaceae	
Mareyopsis longifolia	Euphorbiaceae	
Massularia acuminata	Rubiaceae	
Milecia excelsa	Moraceae	LR/nt
Musanga cecropioides	Cecropiaceae	
Myrianthus arboreus	Cecropiaceae	
Nauclea diderichii	Rubiaceae	VU
Nesogordonia papaverifera	Sterculiaceae	VU
Ongokea gore	Olacaceae	
Oxyanthus speciosus	Rubiaceae	
Pachyelasma tessmannii	Caesalpiniaceae	
Pachypodanthium staudtii	Annonaceae	
Panda oleosa	Pandaceae	
Pausinystalia macroceras	Rubiaceae	
Pentaclethra macrophylla	Mimosaceae	
Pericopsis elata	Papilionaceae	EN
Petersianthus macrocarpus	Lecythidaceae	
Picralima nitida	Apocynaceae	
Piptadeniastrum africanum	Mimosaceae	
Plagiostyles africana	Euphorbiaceae	
Polyalthia suaveolens	Annonaceae	
Pseudospondias microcarpa	Anarcadiaceae	
Pterocarpus mildbraedii	Caesalpiniaceae	
Pterocarpus soyauxii	Caesalpiniaceae	
Pterygota macrocarpa	Sterculiaceae	VU
Pycnanthus angolensis	Myristicaceae	
Rhabdophyllum sp.	Ochnaceae	
Rinorea oblongifolia	Violaceae	
Rinorea sp.	Violaceae	
Rinorea welwitschii	Violaceae	
Rothmannia lujae	Rubiaceae	
Santiria trimera	Burseraceae	
Sorindeia grandifolia	Anarcadiaceae	
Staudtia kamerunensis	Myristicaceae	
Sterculia tragacantha	Sterculiaceae	
Strehlus usambarensis	Moraceae	

Table 20
Nkamouna Environmental and Social Impact Assessment
Flora Inventory and IUCN Status

Name	Family	IUCN Status
Synsepalum longicuneatum	Sapotaceae	
Tabernaemontana crassa	Apocynaceae	
Tabernaemontana penduliflora	Apocynaceae	
Terminalia superba	Combretaceae	
Tessmannia africana	Caesalpiniaceae	
Tessmannia anomala	Caesalpiniaceae	
Tetraberlinia tubmaniana	Caesalpiniaceae	
Tetrapleura tetraptera	Mimosaceae	
Tetrorchidium didymostemon	Euphorbiaceae	
Tieghemella africana	Sapotaceae	EN
Tricalysia crepiniana	Rubiaceae	
Tricalysia discolor	Rubiaceae	
Tricalysia sp.	Rubiaceae	
Trichilia rubescens	Meliaceae	
Trichilia sp.	Meliaceae	
Trichilia welwitschii	Meliaceae	
Trichoscypha acuminata	Anacardiaceae	
Trichoscypha arborea	Anarcadiaceae	
Tridemostemon omphalocarpoides	Sapotaceae	
Trilepisium madagascariense	Moraceae	
Uapaca guineensis	Euphorbiaceae	
Uapaca paludosa	Euphorbiaceae	
Uapaca vanhouttei	Euphorbiaceae	
Vepris louisii	Rubiaceae	
Vitex grandifolia	Verbenaceae	
Vitex sp.	Verbenaceae	
Vtex rivularis	Verbenaceae	
Xanthoxylum gilletii	Rutaceae	
xanthoxylum heitzii	Rutaceae	
Xylopia aethiopica	Annonaceae	
Xylopia hypolampra	Annonaceae	
Xylopia quintasii	Annonaceae	
Xylopia rubescens	Annonaceae	
Xylopia staudtii	Annonaceae	

CR = critically endangered

EN = endangered

VU = vulnerable

LR/nt = Low Risk/near threatened

Table 21
Nkamouna Environmental and Social Impact Assessment
Plant Families and their Absolute Abundances on the Studied Profiles

Family	ST 15990	ST 2655	ST 6942	ST 7046	Transect 10104	Total
Euphorbiaceae	112	95	100	75	65	447
Annonaceae	35	57	32	51	27	202
Olacaceae	26	67	44	28	36	201
Rubiaceae	20	39	29	40	29	157
Meliaceae	12	16	18	21	29	96
Caesalpiniaceae	20	15	10	8	14	67
Fabaceae	12	10	18	20	7	67
Mimosaceae	10	12	13	16	16	67
Irvingiaceae	9	16	10	5	16	56
Myristicaceae	7	8	10	8	14	47
Sapindaceae	8	3	8	5	21	45
Rutaceae	5	4	15	13	3	40
Apocynaceae	4	5	5	13	11	38
Moraceae	13	3	3	9	9	37
Sapotaceae	4	7	7	8	9	35
Burseraceae	1	5	9	6	13	34
Huaceae	7	11	7	6	3	34
Anarcadiaceae	9	8	4	9	3	33
Clusiaceae	6	4	3	13	5	31
Violaceae	1		4	10	4	19
Samydaceae	3	7		2	4	16
Ulmaceae	2	6	3	4	1	16
Vochysiaceae	4	4	4	3		15
Cecropiaceae	12	1		1		14
Ebenaceae	7	2	3			12
Lecythidaceae	4	1			6	11
Sterculiaceae	2				8	10
Flacourtiaceae	2				6	8
Myrtaceae	8					8
Ochnaceae	1	1		3	3	8
Pandaceae	1	2	2		3	8
Rhamnaceae	4				4	8
Lepidobotryaceae		4		1	2	7
Verbenaceae	3	1	1		2	7
Bignoniaceae		2	1	1	2	6
Tiliaceae	2	2	1		1	6
Chrysobalanaceae			1	2		3
Passifloraceae	1				2	3
Anisophylleaceae			1	1		2
Bombocaceae			2			2
Lauraceae					2	2
Anacardiaceae					1	1
Dracaenaceae					1	1
Total	**389**	**433**	**384**	**398**	**405**	**2009**

Table 22
Nkamouna Environmental and Social Impact Assessment
Tree Distribution by Diameter Class and Density

	Density Class (cm)										
Class	**15**	**25**	**35**	**45**	**55**	**65**	**75**	**85**	**95**	**105**	**Density (trunks/l**
ST 15990	233	80	31	10	11	8	1	4	3	8	518.7
ST 2655	252	91	34	21	12	6	3	4	0	10	577.3
ST 6942	228	87	34	5	9	4	4	4	3	6	512
ST 7046	245	79	28	13	8	9	6	3	3	4	530.7
Transect 10104	255	78	35	16	9	2	2	5	2	1	540
Total	1213	415	162	65	49	29	16	20	11	29	535.7

Table 23
Nkamouna Environmental and Social Impact Assessment
Tree Surface Area By Diameter Class, and Average Diameter

Class (cm)	15	25	35	45	55	65	75	85	95	105	Surface Area (m^2/ha)	A
ST 15990	4.92	4.98	4.06	2.1	3.37	3.55	0.52	2.7	2.61	10.54	39.35	
ST 2655	5.39	5.61	4.18	4.35	3.9	2.55	1.68	2.68	0	13.11	43.45	
ST 6942	4.86	5.24	4.29	1	2.9	1.7	2.26	2.88	2.54	7.97	35.65	
ST 7046	5.21	4.96	3.32	2.71	2.39	3.89	3.34	2.34	2.74	6.14	37.03	
Transect 10104	5.39	4.8	4.35	3.23	2.71	0.84	1.22	3.39	1.7	1.05	28.68	
Average	5.16	5.12	4.04	2.68	3.05	2.51	1.8	2.8	1.92	7.76	36.83	

Table 24
Nkamouna Environmental and Social Impact Assessment
Census of Valuable Timber Species by Diameter Class

Code	Commercial Name in Cameroon	Commercial Name/Common Name in US or UK if different	Scientific Name	Diameter Class (cm)							
				50	70	90	110	130	150	170	
				40-60	61-80	81-100	101-120	121-140	141-160	161-180	
1112	Doussié rouge	Afzelia	*Afzelia bipindensis*	2	2	4	2	0	0	0	
1104	Assamela/ Afromosia	Afrormosia	*Pericopsis elata*	3	6	6	0	0	0	0	
1108	Bossé clair	guarea	*Guarea cedrata*	10	29	19	5	0	0	0	
1110	Dibétou	African Walnut	*Lovoa trichilioides*	2	3	2	0	0	0	0	
1114	Ebène	African Ebony	*Diospyros crassiflora*	9	6	3	2	0	0	0	
1116	Iroko		*Milecia excelsa*	0	1	0	0	0	0	0	
1117	Kossipo	Omu	*Entandrophragma candolei*	4	11	24	18	4	0	0	
1118	Kotibé	Danta	*Nesogordonia papaverifera*	9	8	7	0	0	0	0	
1119	Makoré / Douka	Douka	*Tieghemella africana*	9	13	20	4	2	0	0	
1120	Moabi	African pearwood	*Baillonnela toxisperma*	10	14	18	6	4	0	0	
1121	Okoumé	Okoumé/gaboon	*Aucoumea klaineana*	0	0	0	0	0	0	0	
1122	Sapelli	sapele (mahagany)	*Entandrophragma cylindricum*	7	15	15	8	1	0	0	
1123	Sipo	Utile	*Entandrophragma utile*	0	3	1	1	0	0	0	
1124	Tiama	gedu nohor	*Entandrophragma angolense*	7	11	14	0	0	0	0	
1202	Aningré R	anegre	*Aningeria robusta*	2	24	15	0	0	0	0	
1205	Bongo H (Olon)	olon	*Fagara heitzii*	91	69	29	4	0	0	0	
1206	Bubinga rouge	bubinga	*Guibourtia demeusei*	1	2	4	2	0	0	0	
1209	Eyong		*Eribroma oblongum*	0	6	3	3	0	0	0	
1210	Longhi	longhi/african star apple	*Gambeya africana*	8	25	8	0	0	0	0	
1214	Ozigo	Adjouaba	*Dacryodes buettneri*	0	0	0	0	0	0	0	
1215	Pao rosa	dina/pao rosa	*Swartzia fistuloides*	8	13	11	1	0	0	0	
1301	Aiélé / Abel	African Canarium	*Canarium schweinfurtii*	2	6	7	4	0	0	0	
1304	Alep		*Desbordesia glaucescens*	82	103	74	4	0	0	0	
1308	Bilinga	Opepe	*Nauclea diderichii*	7	5	4	0	0	0	0	
1310	Dabéma		*Piptadeniastrum africanum*	30	96	90	9	0	0	0	
1311	Diana Z	African celtis	*Celtis Zenkeri*	20	21	12	2	0	0	0	
1316	Emien	Cheesewood	*Alstonia boonei*	37	75	38	2	1	0	0	

Table 24
Nkamouna Environmental and Social Impact Assessment
Census of Valuable Timber Species by Diameter Class

Code	Commercial Name in Cameroon	Commercial Name/Common Name in US or UK if different	Scientific Name	Diameter Class (cm)							
				50	70	90	110	130	150	170	
				40-60	61-80	81-100	101-120	121-140	141-160	161-180	
1317	Etimoé		*Copaifera mildbraedii*	0	0	0	0	0	0	0	
1318	Eyek		*Pachyelasma tessmannii*	5	7	39	34	14	0	0	
1320	Fraké/Limba	Limba/white Afara	*Terminalia superba*	6	32	32	10	1	0	0	
1323	Iantandza		*Albizia ferruginea*	6	18	16	1	0	0	0	
1324	Ilomba	Cardwood	*Pycnantus angolensis*	27	78	72	8	0	0	0	
1326	Koto	African pterogyta	*Pterygota macrocarpa*	0	5	6	0	0	0	0	
1329	Lat		*Amphimas ferrugineus*	6	20	26	3	0	0	0	
1333	Mukulungu	Elanzok	*Autranella congolensis*	4	17	13	7	3	0	0	
1338	Niové		*Staudia kamerunensis*	31	41	23	0	0	0	0	
1341	Okan		*Cylicodiscus gabonensis*	9	29	61	41	6	3	0	
1342	Onzabili K		*Antrocaryon klaineanum*	3	10	3	1	0	0	0	
1344	Padouk blanc	White padouk/camwood	*Pterocarpus mildbraedii*	35	45	38	3	0	0	0	
1345	Padouk rouge	African padouk/camwood	*Pterocarpus soyauxii*	0	3	3	0	0	0	0	
1346	Tali	Ordeal tree	*Erythropleum ivorense*	25	120	165	30	5	0	0	
1348	Tola	Agba	*Gossweilerodendron balsamiferum*	31	129	75	15	0	0	0	
1401	Abalé	Essia	*Petersianthus macrocarpus*	115	175	80	10	0	0	0	
1419	Abam vrai	Abam	*Gambeya lacourtiana*	12	23	10	0	0	0	0	
1463	Akui			0	2	1	1	0	0	0	
1464	Alen ako			0	2	1	0	0	0	0	
1480	Andok	oba	*Irvingia gabonensis*	19	21	4	0	0	0	0	
1482	Andok ngoé	Irvingia	*Irvingia gradiflora*	4	12	3	0	0	0	0	
1495	Asila koufani / Kioro			4	16	43	7	0	0	0	
1533	Bibolo afum			0	5	4	0	0	0	0	
1588	Ekop andingding ntuma	Ekaba/ekop	tetraberlinia tubmanania	0	0	2	2	0	0	0	
1646	Eveuss		*Klainedoxa gabonensis*	13	51	118	20	1	0	0	
1683	Kapokier	African Tulip Tree/Akata	*Bombax buonopozense*	0	0	1	0	0	0	0	
1728	Moambé jaune			46	16	1	0	0	0	0	

Table 24
Nkamouna Environmental and Social Impact Assessment
Census of Valuable Timber Species by Diameter Class

Code	Commercial Name in Cameroon	Commercial Name/Common Name in US or UK if different	Scientific Name	Diameter Class (cm)							
				50	70	90	110	130	150	170	
				40-60	61-80	81-100	101-120	121-140	141-160	161-180	
1733	Mubala	Ataa	*Pentaclethra macrophyla*	4	20	31	5	2	0	0	
1746	Ndongo makuba			2	2	0	0	0	0	0	
1898	Parasolier	Umbrella tree/African Corkwood	musanga cecropioides	25	36	22	0	0	0	0	
1899	Rikio	Rikio/Sugar plum sp.	*Uapaca guineesis*	53	59	26	7	0	0	0	
2018	Hévéa	Rubber Tree	hevea brasilensis	5	3	1	0	0	0	0	
3087	Uapaca	Sugar plum sp	uapaca sp	51	31	11	2	1	0	0	
Total				901	1595	1359	284	45	3	0	
Percent of Total				21.50%	38.10%	32.50%	6.80%	1.10%	0.10%	0.00%	

Table 25
Nkamouna Environmental and Social Impact Assessment
Halieutic Resources Likely to be Found in the Nearby Streams

Family	Scientific names	River/stream				
		Edjé	Manouo	Mwa Ekaha	Makar	Napene
Cyprinidae	*Barbus aspilus*	+	+	+	-	+
	Barbus faureaui	-	+	+	-	-
	Barbus macrops	+	-	-	-	-
	Barbus martorelli	+	-	-	-	-
	Barbus camstacanthurs	+	-	+	-	-
	Labeo lereensis	-	+	-	-	-
	Labeo darvus	-	+	+	-	-
	Raiamas senegalensis	+	-	-	-	-
Mormyridae	Campylomormyrus phantasticus	+	-	-	+	+
	Mormyrus tapirus	-	-	-	+	-
	Mormyrus hasselquitii	+	-	-	-	-
	Pollimurus rinaslenae	+	-	-	-	-
	Mormyrus déliciosus	+	-	-	-	-
	Mormyrops delicious	+	-	-	-	-
Cichlidae	Nannochromis candidasciatus	+	-	-	-	-
	Hemichromis tasciatus	-	+	-	-	-
	Haplochromis tasciatus	-	+	-	-	-
	Tilapia spp	+	-	-	-	-
Distichodontidae	Distichodus mostratus	+	-	-	-	-
	Eugnathichtys macroterotepis	+	-	-	-	-
Characidae	Alestes dentex	+	-	-	+	-
	Brycinus lonaidinnis	+	+	-	-	-
	Brycinus opistholaenia	+	+	-	-	-
	Phenalogrammus major	-	-	+	-	-
Bagridae	*Auchenoglanis biscutatus*	+	+	+	-	-
	Auchenoglanis longiceps	+	-	-	-	-
	Paranchenoglanis gutatus	+	+	+	-	-
	Clarotes laticops	-	+	-	-	-
Clupeidae	*Ilisha africana (Rasoir) Ethmalosa limbriata*	-	-	-	-	+
		+	-	-	-	-
Hepsetidae	*Hepsetus odoe (Brochet)*	+	+	-	+	+
Schilbeidae	*Eutropius granfilli*	+	+	+	-	+
Polypteridae	*Calamoichthys calabaricus (poisson serpent)*	+	-	-	+	+
Clariidae	*Clarias camerunensis*	+	-	+	-	+
	Clarias buthupogan	+	-	-	-	-
Anabantidae	*Ctenopoma petherici*	+	-	-	-	-
Pomadasyidae	*Plectorhindus macrolepis (Daurade noire)*	+	-	-	-	-
Citharinidae	*Citharinus citharus*	+	-	+	-	-
Crustacea	*Crevettes*	+	+	+	+	+
	Crabes		+	+		+
Reptiles	*Crocodiles nains*	+	+	+	+	+
	Tortues d'eau	+	+	+	+	+

Table 26
Nkamouna Environmental and Social Impact Assessment
Principal Species Caught in Each Stream

River/stream	Principal species caught
Edjé	*Labeo parvus* *Eutropius grenfillis* *Alestes dentex* *Citharinus citharus* *Barbus aspilus* *Mormyrus hasselquistii* *Brycinus opithotaenia* *Schilbe moistus* *Mormyrops delicious* *Clarias camerunensis*
Manouo	*Barbus foureaui* *Auchenoglanis biscutatus* *Brycinus longipinnis* *Crabs*
Mwa Ekaha	*Phenacogrammus major* *Citharinus citharus* *Clarias camerunensis* *Barbus camptacanthus*
Makar	*Calamoichthys calabaricus* *Mormyrus tapirus* *Alestes dentex* *Clarias camerunensis* *Clarias buthupogan* *Prawns*
Napene	*Barbus aspelus* *Clarias camerunensis* *Calamoichthys calabaricus* *Crabs* *Prawns*

Table 27
Nkamouna Environmental and Social Impact Assessment
Large and Intermediate Mammals Inventory and Protection Status

ORDERS – *Species*	**IUCN (2002)**	**CITES**	**MINEF Cameroon**	**Seen or heard**	**Indications of presence**
PRIMATA					
Gorilla gorilla gorilla (Lowland gorilla)	EN	I	A		N, TrM
Pan troglodytes troglodytes (Chimpanzee*)*	EN	I	A		N
Colobus satanus (Black Colobus*)*	VU	II		X	
Cercocebus albigena (Grey-cheeked mangabey*)*		II		X	
Cercopithecus cephus (Moustached monkey*)*		II		X	
C. nictitans (Putty-nosed guenon)		II		X	
C. pogonias pogonias (Crowned guenon*)*	EN	II		X	
Cercocebus galeritus agilis (agile mangabey)		II		X	
RODENTIA					
Atherurus africanus (African brush-tailed porcupine*)*					TR
Crycetomys gambianus (African Giant Rat)				X	
CARNIVORA					
Atilax paludinosus (Marsh mongoose)				X	
Lutra maculicolis (Spotted-necked otter)					TR
Aonyx congicus (Congo otter)	DD	I			TR
Nandinia binotata (African Palm Civet)					TR
PHOLIDOTA					
Uromanis tetradactyla (Long-tailed Pangolin*)*					TrM
Phataginus tricuspis (Tree Pangolin*)*					TrM
Smutsia gigantea (Giant Ground Pangolin*)*			A		TrM, TR
ARTIODACTYLA					
Potamochoerus porcus (Red forest hog*)*			B	X	TrM, TR
Cephalophus monticola (Blue duiker*)*		II		X	
C. dorsalis (Black-backed (bay) Duiker)	LRnt	II		X	
C. Sylvicultor (Yellow-backed Duiker*)*	LRnt	II	B		TR

EN = Endangered
VU = Vulnerable
LRnt = Low Risk near threatened
Deficient data
TR = tracks, TrM = traces of meal, N = nests

Table 28
Nkamouna Environmental and Social Impact Assessment
Village Meetings - Socio-economic Baseline

Village	Date	Time	Men	Women	Total	Village Chief or his Representative
Pohenpoum I	Monday 17 May	14H	41	32	73	MABIA Mabia Jean-Pierre
Pohenpoum II	Monday 17 May	8H	30	32	62	MABIA Jean-Claude
Melene	Tuesday 18 May	8H	12	10	22	KPAMAN Liboire
Doumzok + Payo	Tuesday 18 May	14H	34	21	55	LOMIE Richard
Eschiambor	Wednesday 19 May	8H	31	21	52	OLENE Maboul Hypolyte
Ntam I	Friday 21 May	8H	11	10	21	ABIADOM Martin
Achip	Friday 21 May	11H	22	22	44	MENKALA Philippe
Zoulabot I	Saturday 22 May	8H	37	14	51	BISSOLABAB Blaise
Mingongol Mpaneditiep Mpane Kobera	Saturday 22 May	13H	86	13	99	MINKAM Ignace NDEBI Amatap Roland MINKOHO Isidore
Kongo	Monday 24 May	8H	62	43	105	DJOUAM Bamit
Ngola I (Bantu and Baka)	Tuesday 25 May	8H	71	55	126	MENTOM Pius
TOTAL			**437**	**273**	**710**	

Table 29
Nkamouna Environmental and Social Impact Assessment
Age Distribution and Sex Structure of the Cameroon Population

Age group	Age Structure Percentage	Sex ratio (m/f)
At birth	42	1.03
under 15 years		1.02
15 – 64 years	54.8	1.01
65 years and over	3.2	0.82
Total population	-	1.01

Table 30
Nkamouna Environmental and Social Impact Assessment
Chiefdoms of the Pohempoum I-Mpane Kobera Corridor

Village	Type of Chiefdom	Distance from Lomié (km)
Pohempoum I	3rd degree	6
Pohempoum II	2nd and 3rd degrees	8
Doumzok I and Payo	3rd degree	12
Eschiambor	3rd degree	21
Melene	3rd degree	23
Kongo	3rd degree	31
Ntam I	3rd degree	39
Acip	3rd degree	45
Ngola Baka and Bantu	3rd degree	50
Zoulabot I	2nd and 3rd degree	58
Mingongol	3rd degree	58
Mpaneditiep	3rd degree	60
Mpane Kobera	Two 3rd degree chiefdoms	64

Table 31
Nkamouna Environmental and Social Impact Assessment
NGOs and Associations in the Nkamouna Area

Association/Group	Type	Ngola Baka	Ngola I	Kongo	Total
Association of married women of Kongo	Tontine			5	5
Association of Parents of Students				1	1
Kongo Planters Association	Work group			2	2
Ngola Planters Association	Work group		17		17
BESDAN (société forestière)			1		1
Village Development Committee			5		5
Chaleur (“Heat”)	Tontine		23		23
Bankoho Community			1	39	40
Dja and Mpomo Development Committee				4	4
Cœurs Vaillants (“Brave Hearts”)	Tontine			11	11
Vigilance committee				1	1
Entente (“Agreement”)	Tontine		23	1	24
Espoir (“Hope”)	Tontine			4	4
Essayons (“Let’s try”)	Tontine			4	4
Gbopaba	Ethnic	1	36		37
Générale Epargne et Crédit Est Cameroun (GECEC)	Cooperative savings bank		1		1
Ngola Planters GIC	GIC			1	1
Koulompele	Tontine			1	1
Lituelbe	Tontine		14		14
Mapa			2		2
MIGK				20	20
Nkwabepah	Tontine		19		19
RDPC Womens Organization				1	1
RDCP Youth Organization			1		1
Rally of Students and Youth of Lomié			1		1
Relève (“backup”)	Tontine		4		4
Reveil (“wake up”)	Tontine		3		3
Kongo Maka Society				2	2
Tsin Sao				1	1

Table 32
Nkamouna Environmental and Social Impact Assessment
Activities of Household Members in the Nkamouna Area

Category	Kongo	Ngola I	Ngola Baka	Total
Student	**123**	**214**	**22**	**359**
Farmer	**103**	**149**	**26**	**278**
Hunter	**3**	**9**	**11**	**23**
Housewife	**14**	**26**	**0**	**40**
Traditional midwife	2			2
Chauffeur	3			3
Traditional chief		1		1
Trader	10	2		12
Teacher	1	4		5
Entrepreneur		1		1
Laborer	1			1
Mason	3			3
Carpenter		1		1
Geovic laborer	9	6		15
Fisherman			9	9
Woodcutter	2			2
Tailor	1			1
Technician	1	1		2
Night watchman	3			3

Table 33
Nkamouna Environmental and Social Impact Assessment
Annual Household Earnings in Villages Near Nkamouna

Village	Agriculture	Livestock	Hunting	Fishing	NTFPs	Small business	Salary	Pension	Rents	O
Kongo	41,224,500	12,525	2,615,900	662,621	5,046,000	20,578,000	12,592,000	0	555,000	1
Ngola I	53,749,750	41,095	17,699,100	1,153,000	9,772,750	20,339,000	15,484,000	1,416,000	0	4
Ngola Baka	2,249,000	0	737,800	201,100	547,100	30,000				
Total	96,985,250	3,198,739	21,052,800	2,016,721	15,365,850	40,947,000	28,076,000	1,416,000	555,000	5
Mean	962,557	31,671	172,563	13,908	108,210	422,134	295,537	17,060	6,529	

Table 34
Nkamouna Environmental and Social Impact Assessment
Mammals Hunted by Kongo Village Hunters

Scientific Name	Common Name	Number of hunters (traps only) citing species	Number of hunters (traps and/or guns) citing species	Total number of times cited	IUCN Red List (
Cephalophus monticola	Blue Duiker	*24*	*19*	43	-
Cephalophus dorsalis	Black-backed Duiker	*23*	*19*	42	*X*
Atherurus africanus	African Brush-tailed Porcupine	*24*	*17*	41	-
M. tricuspis	African Tree Pangolin	*22*	*14*	36	-
Manis tetradactyla	Long-tailed Pangolin	*22*	*14*	36	-
Potamochoerus porcus	Red Forest Hog	*16*	*17*	33	-
Cercocebus galeritus agilis	Agile Mangabey	*8*	*19*	27	-
Cercopithecus nictitans	Putty-nosed Guenon	*4*	*19*	23	-
C. sylvicultor	Yellow-backed Duiker	*14*	*8*	22	*X*
Cricetomys gambianus	Gambian Giant Rat	*11*	*8*	19	-
Cercopithecus cephus	Moustached Monkey	*2*	*12*	14	-
Tragelaphus spekei	Sitatunga	*7*	*5*	12	-
Thryonomys swinderianus	Greater Cane Rat	*6*	*5*	11	-
Gorilla gorilla	Lowland Gorilla	*3*	*5*	8	*X*

Table 34
Nkamouna Environmental and Social Impact Assessment
Mammals Hunted by Kongo Village Hunters

Scientific Name	Common Name	Number of hunters (traps only) citing species	Number of hunters (traps and/or guns) citing species	Total number of times cited	IUCN Red List (
Manis gigantea	Giant Ground Pangolin	*2*	*6*	8	-
Nandinia binotata	African Palm Civet	*6*	*2*	8	-
Pan troglodytes	Chimpanzee	*3*	*5*	8	*X*
Cercopithecus pogonias	Crowned Guenon		*7*	7	*X*
Cercocebus albigena	Grey-cheeked Mangabey	*1*	*5*	6	-
Colobus satanus	Black Colobus		*3*	3	*X*
Colobus guereza	Black and White Colobus		*2*	2	
Dendrohyrax arboreus	Tree Hyrax	*1*	*1*	2	-
Loxodonta africana cyclotis	African Forest Elephant		*2*	2	
Neotragus batesi	Cameroon Pygmy Antelope	*2*		2	-
Syncerus caffer nanus	African Forest Buffalo		*2*	2	
Viverra civetta	Civet	*2*		2	-
Aonyx congica	Congo Otter	*1*		1	*X*
Atilax paludinosus	Water Mongoose	*1*		1	-
Panthera pardus	Leopard	*1*		1	-

Table 35
Nkamouna Environmental and Social Impact Assessment
Annual Household Expenditure in Villages Near Nkamouna

Village	Housing	Food	Clothing	Education	Health	Family ceremonies	Travel	Family visits	Other	T
Kongo	372,000	6,991,200	4,405,000	1,573,500	2,218,000	2,037,000	4,482,500	1,429,000	2,059,000	25
Ngola I	36,000	12,775,600	8,101,500	7,869,100	7,137,000	3,300,500	7,463,000	2,274,000	5,094,500	54
Ngola Baka		142,400	131,000	45,500	39,000	6,000	54,000	27,000	25,000	
Total	408,000	19,909,200	12,637,500	9,488,100	9,394,000	5,343,500	11,999,500	3,730,000	7,178,500	80
Mean	4 690	173 123	105 313	76 517	87 794	53 435	108 104	35 865	76 367	

Table 36
Nkamouna Environmental and Social Impact Assessment
Annual Disposable Income in Villages Near Nkamouna

Village	Earnings	Expenses	Disposable income
Kongo	84,846,546	25,567,200	59,279,346
NgolaI	123,737,295	54,051,200	69,686,095
Ngola Baka	3,849,000	469,900	3,379,100
Total	215,339,960	80,088,300	135,251,660
Average per household	2,063,872	721,208	1,342,664
Average per person (7 persons per household)	294,800	103,000	191,800

Table 38
Nkamouna Environmental and Social Impact Assessment
Solutions Proposed by the Local Population

Solutions	Kongo	Ngola I	Ngola Baka	Total
Reduce isolation	21	19	0	40
Ensure access to finance	6	12	0	18
Intensify agriculture	15	1		16
Health centers	2	10	0	12
Permanent jobs	7	2	0	9
Increase the population	2	5	0	7
Create an agricultural support center	6			6
Electrification	4			4
Ensure drinking water supply		3		3
Work at Geovic	3			3
Improve communications	2			2
Organiser sales		2		2
Better equipment	2			2
Access to property	1			1
Improve legal framework		1		1

Table 37
Nkamouna Environmental and Social Impact Assessment
Principal Problems of the Local Population

Problem	Kongo	Ngola I	Ngola Baka	Total
Access to finance	20	12	10	42
Poverty	20	11	11	42
Bad roads	20	14	7	41
Isolation	18	19	2	39
Health/illness	8	16	8	32
Lack of employment	10	8	9	27
Lack of clients	9	14	1	24
Lack of Inputs	7	4	0	11
Low productivity	8	1	0	9
Malnutrition	4	1	3	8
Poor health infrastructure	2	2	3	7
Poor housing	2		4	6
Access to markets	1	4	0	5
Lack of Electricity	4	1	0	5
Individualism/jealousy	4	1		5
Alcoholism	4			4
Laziness	4			4
Loss/wandering of livestock	2	1		3
Difficulty in getting supplies	2			2
Lack of potable water		2		2
Emigration	2			2
Low population density	1			1
Legal framework		1		1
Low prices		1		1
Tradition	1			1
Lack of transport		1		1
Old age		1		1
None		1		1

Table 39
Nkamouna Environmental and Social Impact Assessment
Primary School Attendance in the Lomié Subdivision

School	Public	Catholic	Total
Boys	1961	128	2089
Girls	1528	122	1650
Total	3489	250	3739

Table 40
Nkamouna Environmental and Social Impact Assessment
Attendance at Lomié SAR/SM

Section	Boys	Girls	Total
1st year masonry	24	0	24
1st year carpentry	28	0	28
1st year home economics	0	26	26
2nd year masonry	12	0	12
2nd year carpentry	16	1	17
2nd year home economics	0	14	14
Total	80	41	121

Table 42
Nkamouna Environmental and Social Impact Assessment
Attendance at Lomié High School

First cycle			
Class	**Boys**	**Girls**	**Total**
6th	60	46	106
5th	47	38	85
4th	45	20	65
3rd	44	36	80
Second cycle			
2nd	22	8	30
1st	30	20	50
Final	7	3	10
TOTAL	225	171	426

Table 42
Nkamouna Environmental and Social Impact Assessment
Housing Characteristics in Villages Near Nkamouna

		Ngola Baka	Ngola I	Kongo	Total
Construction material	Brick/cement		3	5	8
	Half brick		10	5	15
	Mud brick	23	56	49	128
	Wood planks			1	1
	Half brick and mud brick		1		1
Roofing material	Raphia mat	22	22	29	73
	Corrugated iron	1	35	28	64
	Mat and corrugated iron		13	3	16
Floor	Mud	22	66	55	143
	Cement	1	4	5	10
Fenced	Yes	1	4	2	7
	No	22	66	50	138
Status of kitchen	Integrated	7	17	20	44
	Separate	15	52	37	104
Status of latrines	Open air	14	38	41	93
	Uncovered ditch	1	7	4	12
	Ditch with shelter		23	7	30
	Modern		1		1
Granary	Traditional	15	70	41	126
	None	3		9	12
Number of buildings per concession	1	16	12	32	60
	2	7	37	7	51
	3		11	9	20
	4		7	5	12
	5 to 7		3	7	10
Housing status	Own	21	70	52	143
	Rent			6	6
Livestock area	Yes		4	2	6
	No	14	62	27	103

Table 43
Nkamouna Environmental and Social Impact Assessment
Main Household Durable Goods in Villages Near Nkamouna

Village	Wheelbarrows	Sewing machines	Radio-cassette players	Generators
Kongo	9	4	45	1
Ngola I	7	8	71	3
Ngola Baka			1	
Total	16	12	117	4

Table 44
Nkamouna Environmental and Social Impact Assessment
Agricultural Lands in the Nkamouna Area

Village	Total cultivated area	Area lying fallow	Total agricultural lands
Kongo	203	151	354
Ngola I	339	420	759
Ngola Baka	24	49	73
Total	565	620	1185

Areas in hectares

Table 45
Nkamouna Environmental and Social Impact Assessment
Distances from Households to Fields in the Nkamouna Area

	Kongo	Ngola I	Ngola Baka	Total
Subsistence crops				
< 500m	18	17	6	41
500 m - 1km	4	24	3	31
1 - 2km	23	21	14	58
2 - 5km	11	7	0	18
Cash crops				
< 500m	9	12	2	23
500 m - 1km	0	7	0	7
1 - 2km	1	10	1	12
2 - 5km	16	30	0	46
< 500m	16	30	0	46

Table 46
Nkamouna Environmental and Social Impact Assessment
Mode of Acquisition of Fields in the Nkamouna Area

Mode of Acquisition	Kongo	Ngola I	Ngola Baka	Total
Subsistence crop fields				
Usufruct right	50	66	22	138
Purchase	4			4
Inheritance	4	1		5
Cash crop fields				
Usufruct right	8	24		32
Purchase	2	1		3
Inheritance	2	33		35
Household gardens				
Usufruct right	8	1		9
Inheritance	2			2

Table 47
Nkamouna Environmental and Social Impact Assessment
Productive Equipment in the Nkamouna Area

Village	Portable saws	Chainsaws	Sprayers	Machettes	Hoes	Axes
Kongo	11	4	7	49	10	9
Ngola I	39	2	34	206	186	47
Ngola Baka				13	3	4
Total	50	6	41	268	199	60

Picks
1
8
1
10

Table 48
Nkamouna Environmental and Social Impact Assessment
Main Health Problems along the Pohempoum I-Mpane Kobera Corridor

Village	Main Health Problems
Pohempoum II	Malaria, rheumatism, piang, STD/AIDS
Doumzok et Payo	Malaria, diarrhea, filariose, scale, piang, typhoid, hernia, pancreas, tuberculosis, jaundice, measles, breastfeeding problems
Eschiambor	Malaria, diarrheas, tuberculosis, filaires, scale, gastric problems, STD/AIDS
Melene	Malaria, intestinal worms, hernia, dysentery, scale, jaundice, Abscess
Kongo	Malaria, STD/AIDS, tuberculosis, gastro-enteritis, diarrheas, skin diseases
Ntam I et Achip	Skin diseases, early menopause
Ngola I	Illnesses related to poor hygiene, water-borne illnesses
Zoulabot I	Malaria, STD/AIDS, gastro-enteritis, diarrheas, repiratory problems, malnutrition
Mingongol, Mpaneditiep and Mpane Kobera	Colds, malaria, gastric complaints, tuberculosis, STD/AIDS