

SECTOR A

TABLES

Table 1.1-1 Factory and Employee Numbers in Cities

CITY	City	Colima Terr.	El Comate	Las Tzucias	Guaymas	Ca.	Panama	San Diego de la Aldea	San Juan de la Aldea	Chandliva	Michoan	Ordinary Ad. Ty	San Francisco de Yeo	Total
		Yeo	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea	San Juan de la Aldea		
31100	Food product factory excl. soft drinks						1(203)			1(691)			1(26)	3(920)
31111	Abattoirs for cattle, pigs, sheep, horses and rabbits			1(45)	1(90)					1(33)				3(168)
31112	Farms of chickens and other animals		1(80)	1(28)	1(328)									2(408)
31113	Preparation and manufacture of meat conserves	1(34)		2(261)						1(56)				4(311)
31121	Milk pasteurization and bottling					1(14)								1(14)
31173	Biscuits, shortcake and noodles									1(390)			1(286)	2(676)
31221	Production of animal food			1(39)	1(39)									2(78)
31311	Dairyery		1(373)									1(440)		2(813)
31341	Production of soft drinks												1(18)	1(18)
31342	Bottling and gasification of natural mineral waters								1(45)					1(45)
Subtotal of food related factories-B32		1(34)	2(633)	4(345)	3(457)	1(14)	1(203)	0	1(45)	4(1179)	0	1(400)	3(336)	21(3715)
32111	Manufacturer of textile fibers					1(23)								1(23)
32112	Spinning, weaving and finishing of wool and mixed fibers					1(11)						1(37)		2(48)
32113	Spinning, weaving and finishing of cotton, artificial, synthetic and mixed fibers			3(859)		2(120)				5(376)	1(166)	1(61)		12(1576)
32311	Tannery and finishing of leather						1(41)							1(41)
32321	Industry to prepare tanning leather						2(55)							2(55)
35131	Synthetic resins, plastic materials and artificial fibers					1(23)								1(23)
35135	Synthetic resins, plastic materials and artificial fibers, except glass			1(117)		1(24)				1(700)	1(37)			4(832)
35211	Manufacturer of paint and varnishes			1(11)		1(64)				3(21)			1(16)	6(914)
35231	Manufacturer of soaps and cleaning products			1(48)	1(236)		1(39)			1(210)			3(284)	2(821)
35234	Manufacturer of perfumes and cosmetics													0
35291	Manufacturer of polishing products, waxes and polishes			2(92)										2(92)
35292	Manufacturer of adhesive, glue and grouting for textile factory									1(45)				1(45)
35295	Manufacturer of adhesive materials, glues, gelatin and gums									1(18)				1(18)
36200	Pottery and porcelain maker												1(80)	1(80)
36201	Production of fiberglass					1(15)	1(72)							2(87)
36991	Manufacturer of floor tiles					1(300)							1(1032)	2(1332)
3699	Manufacturer of other non-metallic products										1(42)			1(42)
37102	Manufacturer of iron and steel, excl. pig iron and without rolling					1(12)	1(24)			1(350)				3(386)
37201	Production of non-ferrous metals and alloys			1(180)		3(218)					1(41)		1(85)	6(524)
38191	Manufacturer of metallic products, excl. machinery			1(22)			2(136)						1(53)	4(205)
38193	Metal plating		1(25)	2(346)		1(25)	1(33)			2(321)		2(141)		9(911)
38431	Car parts factory			1(296)										1(296)
38433	Automobile spare parts factory					2(414)		1(212)		1(70)		1(26)		5(822)
29011	Lead quarry			1(7)		2(19)	2(19)						2(16)	8(61)
Subtotal of non-food related factories		0	0	14(217)	1(254)	18(179)	11(643)	1(712)	0	15(2311)	4(643)	8(318)	9(1564)	72(9113)
Total		1(34)	3(678)	18(2323)	4(693)	19(1292)	12(546)	1(212)	1(45)	18(3481)	4(643)	9(718)	12(1851)	103(15028)

Note: Employee numbers in parentheses

Table 1.1-2 (1/5) Inventory of Representative Factories in the Study Area

code	Name	Category (CIU)	Location	Municipality	Registration	Treatment system	Type of treatment system	Water source	Volume of using water (ton/day)	Volume of wastewater (t/day)	Water body receiving wastewater	Kind of Products	Total production (ton/year)	Employees	Work h/day	Work d/wk.
F-1	Ron Santa Teresa	Alcohol Production (31311)	Had. Santa Teresa El Consejo Edo. Aragua	Jose Felix Ribas	Yes	Yes	UASB	5 wells	243	288	Cano Tiquirito	Rum and alcoholic beverages	12x10 ³	500	9	5
F-2	La Monserratina	Sausagery (31113)	Andres Bello St.No.4 Las Tejerias Industrial Zone	Santos Michelena	Yes	No	-	1 well	25	25	Sewers	Sausage, ham, blood pudding	Sausage: 960, Ham:240 Blood-pudding: 384	69	8	5
F-3	Proagro	Fowl Processing (31112)	Guayas Industrial Zone Curiepe road	Santos Michelena	Yes	Yes	Biological System	8 wells	1800	1800	Tuy River	Poultry	60,000 per day	339	8	6
F-4	Industrias Savoy	Snack Factory P-P7 (31173)	Charallave - Ocumare Road, KM 1, Pitahaya Flache	Cristobal Rojas	Yes	Yes	Biological System	Mains	200	200	Qda. El Dividive	Corn Flour	-	390	8	5
F-5	Beneficiadora Airebi	Slaughter-house (31111)	La Bonanza Sector, Old Road, Charallave - Caracas	Gualcaipuro	Yes	No	-	Mains Cistern	80	80	Qda. Charallave	Pork Meat	2,200	33	6	5
F-6	Industrias Savoy	Snack Factory P-P7 (31173)	Ocumare - Yare Road, KM 6	Simon Bolivar	Yes	No	-	1 well & mains	167	85	Tuy River	Salad Snacks	200-300	286	20	6
F-7	Pepsi Cola	Soft Drink Plant (31341)	Ocumare - San Francisco de Yare Road	Simon Bolivar	Yes	Yes	Irrigation	Mains	22.5	15	Infiltration	Soft drink	2,100	18	8.8	5
F-8	Ilamaca	Milky Factory (31121)	Ramon Rodriguez Street, Marin J. Industrial Zone, CUA, Miranda ST.	Urdaneta	Yes	Yes	Grease removal Biological reactor-sedimentation	Mains	31.9	32	Tuy River	Butter, Cheese	Butter 0.4ton/d Cheese 0.3ton/d	14	9	5
F-9	Industrias Pampero	Alcoholic Beverages (31311)	Ocumare - Yare Road, Aponte Sector	Lander	Yes	Yes	Biological sedimentat. drying beds	Mains	6,500	320	Tuy River	Alcoholic Drink	14,365	236	8	5

Table 1.1-2 (2/5) Inventory of Representative Factories in the Study Area

code	Name	Category (C11U)	Location	Municipality	Registration	Treatment system	Type of treatment system	Water source	Volume of using water	Volume of wastewater (t/day)	Water body receiving wastewater	Kind of Products	Total production (ton/year)	Employees	Work h/day	Work d/wk.
F-10	Avicola La Mora	Poultry slaughtering (31112)	Hacienda Tiquire Esperanza	Jose Felix Ribas	Yes	Yes	Activated sludge	1 well	201	201	Qda. Tiquirito	Packed Chicken	Packed chicken 360000/m	80	8.8	5
F-11	Provegran	Meat & bone processing (31152)	Las Tejerias, Canore Sector	Santos Michelena	Yes	Yes	9 Steps - chlorination chamber	1 well	500	202	Qda. Guayas	Processing/ sub products	23,400	85	24	6
F-19	Castelo Blanco Industrias	Ham & Sausage factory (31113)	Charalave, Alvarenga Hills	Cristal Rojas	Yes	No	Septic Tank	Mains	6	6	No	Ham Sausages	2,080	60	8	5
N-10	Grupo Manufacturero Unidad (Tannery)	Leather coloring factory (32321)	Paracotos	Guaicaipuro	Yes	No	Sediments dried and transported to la Bonaza Landfill	1 well	0.6	0.6	Stored in 3 tanks, treated and discharge into Qua.	Leather Colored	1500-1600 per month	11	9	5
N-11	La Union Concordia Tannery	Leather finishing (32321)	Paracotos KM2, Tacata Road	Guaicaipuro	Yes	Yes	Physical - Chemical	1 well	60	60	Qda. Maitana	Leather for Shoes	300,000 ft ²	42	9	5
N-12	Arenera Paracotos	Sand Production (2901)	Paracotos Main Avenue	Guaicaipuro	Yes	No	Septic Tank for domestic waste	1 well	2000	2000	Sedimentator to Qda. Maitana	Sand	Sand, 600m ³ /m	11	8	5
N-13	Alfombras y Fietros Iberia	Carpet factory (32112)	Las Tejerias	Santos Michelena	Yes	Yes	3 Storage tank Treatment tank Sed.tanks, Drying beds	Mains	100	40	Sewer Net, Tuy River	Carpet	Carpet 100,000m ² /month)	36	9	5
N-14	Pinturas Manpica	Paint factory (35211)	Tejerias Industrial Zone, end of "Elias Rodriguez" Street	Santos Michelena	Yes	No	-	1 well	2	0.25	Sewer Net, Tuy River	Water Paint (90%), Oil Paint	1356	15	8	5
N-15	Textilana	Textile finishing (32113)	Tejerias Industrial Zone, "Andres Bello" Avenue	Santos Michelena	Yes	No	-	1 well	922	748.8	Sewer Net, Tuy River	Textiles	440,000 linear meters	230	16	5.5

Table 1.1-2 (3/5) Inventory of Representative Factories in the Study Area

code	Name	Category (CIU)	Location	Municipality	Registration	Treatment system	Type of treatment system	Water source	Volume of using water	Volume of wastewater (t/day)	Water body receiving wastewater	Kind of Products	Total production (ton/year)	Employees	Work h/day	Work d/wk.
N-16	Vengrif	Metal mechanics (37201)	Tejerias Industrial Zone, "Andres Bello" Avenue	Santos Michelena	Yes	Yes	Physical - Chemical Treatment	1 well	42	42	Sewer Net, Tuy River	Brass Tubes & Pipes	Brass Tubes & Pipes	180	9	5
N-17	Industrias Vargas	Cosmetics factory (35232)	Las Guayas Industrial Zone, Cadafe Street, Guayas	Santos Michelena	Yes	No	-	2 wells	9	9	Sewers, Tuy River	Shampoo	50,000kg/week 2600ton/y	100	8	5
N-18	Mack de Venezuela	Truck assembling (38431)	Las Tejerias	Santos Michelena	Yes	Yes	Physical Chemical System	1 well	15	15	Sewers, Tuy River	Trucks	8 per day	-	9	5
N-21	Terminados de Aluminio Alumbr	Metal mechanics (37201)	Alvarenga Industrial Urbanization, Tricentenario Av.	Cristobal Rojas	Yes	Yes	Physical Chemical System	Mains	29	28.8	Sewers, Tuy River	Aluminum sections	3 ton/day	20	16	5
N-22	Multiprens	Car parts factory (38433)	Charallave - Qua Road, KM 2, Corpoindustria Industrial	Cristobal Rojas	Yes	No	-	Mains	59	34.8	Sewers	Car parts		170	8.8	5
N-23	Aplanchados Rey David	Indigo Industrial Pre-Washed (32112)	Tuy River Industrial Urbanization	Cristobal Rojas	Yes	No	-	Mains	15	12	Sewers	Jeans	1200 Jeans/day	13	9	5
N-24	Aiesa	Electric Panels (3699)	Charallave - Ocumare Road, KM6	Cristobal Rojas	Yes	No	Domestic = Septic Tank	Mains	-	-	Qda. Charallave	Electric Panels	-	42	9	5
N-25	Petrosima Quimica	Petro Chemical Industry (35135)	Charallave - Ocumare Road, Pitahaya Sector	Cristobal Rojas	Yes	Yes	Industry = ?, Domestic = Yes	Mains	60	Industry = 10, Domestic = 30 - 50	All wastes recovered	Plastic products	-	700	24	7
N-26	Madosa	Cooker Assembling (37101)	Alvarenga Industrial Urbanization, Charallave	Cristobal Rojas	Yes	Yes	Electrical Chemical Treatment System	Mains	100	100	Qda. El Mamon	Cooker	500 U/m	350	9	5
N-27	Manufactura de Algodon Inca	Medical Cotton & Carpet factory (32113)	Charallave - Ocumare del Tuy Old Road, Pitahaya Sector	Cristobal Rojas	Yes	Yes	Crude Water Reception Tank	Mains	30	30	Qda. Dividivi	Carpets Cotton	-	160	9	5

Table 1.1-2 (4/5) Inventory of Representative Factories in the Study Area

code	Name	Category (C11U)	Location	Municipality	Registration	Treatment system	Type of treatment system	Water source	Volume of using water (ton/day)	Volume of wastewater (t/day)	Water body receiving wastewater	Kind of Products	Total production (ton/year)	Employees	Work h/day	Work d/wk.
N-28	Hilanderas Hicril	Spinning Mill (35135)	Tuy City Industrial Zone, Shed #56,57	Lander	Yes	No	-	Mains & Cistern	30	30	Sewers - Tuy River	Yarn (Acril 100%)	30000 - 40000Kg/month	100	16	6
N-29	Quimicas Polyresin	Elastomers & Polyester Production (35135)	Bolivar Avenue, El Cerrito Route	Lander	Yes	No	Domestic Septic Tank	1 well	115	3	Storage tanks	Elastomers, Polyester	1560	88	24	20
N-31	Industrias Ferrogalvan de Venezuela	Foundry (37201)	Mata Sector, 1st Parcel of Land, #384	Lander	Yes	No	-	Mains	10.5	0	No discharge	Electric & Phone adapters	25ton/m	41	24	5
N-32	Balgres	Ceramic Floor Tile factory (36911)	Yare - Santa Teresa Road	Simon Bolivar	Yes	Yes	Storage Tank	Mains, Lagoons, Rain-fall	950	300	Recycled	Floor Tiles	15000 m ² /day	1039	8	6
N-33	Detergentes Yare	Detergent factory (35231)	Santa Teresa - San Fco. de Yare Road, Pararrayos Sector	Simon Bolivar	Yes	Yes	Recycle System	Mains	20	Recycled	Recycled	Detergents	3600 ton/year	50	16	5
N-34	Asea Brown Boveri	Metal mechanics (37201)	Santa Teresa - San Fco. de Yare Road, KM 6	Simon Bolivar	Yes	Yes	Physical Chemical System	Mains	500	300	Tuy River	Transmission, Line Tower Structures	7000-8000 ton/year	85	9	5
N-35	Textiles La Fila	Textile factory (Tannine) (32113)	La Fila Sector, La Laguna Street	Urdaneta	Yes	Yes	Sedimentator & Solids Separator	Mains	200	200	Sewers	Nylon, Cotton, Polyester Cloths	50	109	7	5
N-36	Fabrica de Aires Acondicionados	Car Parts Factory (38433)	Cua Perimetral Avenue, Marin J. Industrial Urb.	Urdaneta	Yes	No	-	Mains	70	70	Qda. Aparay, Tuy River	Vehicle, Air Conditioner, Evaporators	100,000	300	9	5
N-37	Dexalum	Aluminium sections finishing factory (37201)	Paracaima Interprise Center, El Canal Avenue, Shed #2, Marin	Urdaneta	Yes	No	Directly to Sewer Net	Mains	2 0'3	2.5	Tuy River	Aluminium sections	25000-30000 Meters/y	14	8	5

Table 1.1-2 (5/5) Inventory of Representative Factories in the Study Area

code	Name	Category (CIU)	Location	Municipality	Registration	Treatment system	Type of treatment system	Water source	Volume of using water (ton/day)	Volume of wastewater (t/day)	Water body receiving wastewater	Kind of Products	Total production (ton/year)	Employees	Work h/day	Work d/wk.
N-38	Corporacion Industrial Americer	Ceramic Floor Tile factory (36911)	Marin J. Industrial Zone	Urdaneta	Yes	Yes	Solid Decantation	Mains, Well	90	Clalified water reused	Domestic w/water Qda.	Ceramic Floor Tile	2.5 x 10 ⁶ m ²	300	24	7
N-39	Metal Mecanica Tuy	Foundry (37201)	Marin J. Industrial URB	Urdaneta	Yes	No	-	Mains	from 10 to 12	0.3	Tuy River	Metal-casting	5500 picces/m	44	9	5
N-40	Infra Division Aluminio, S.A. (Industria Nacional Fabrica de Redondores)	Metal Mechanics (37201)	Marin J. Industrial URB	Urdaneta	Yes	Yes	Biological Treatment System	Mains	50	40	Tuy River	Aluminum Radiators	150000 unit / year	160	8	5
N-41	Estampados Textiles Como, C.A.	Industrial Dyeing (32113)	Charallave - Ocumaredel Tuy Road, Las Juajitos Sector	Cristbal Rojas	Yes	Yes	Physical - Chemical Process	4 wells	200	200	Qda. Charallave	Dye and Finishing Clothes	5000*600	45	16	5.5

Table 1.1-3(1/2) Inventory of Piggeries

Upper Basin

No.	Name	Location	Animal numbers	Treatment system	Water source	#Volume of water used (tons/day)	Water body receiving waste water	Working hours (h/day)	Working days (d/week)	Working days (d/year)	Number of workers
1	Funchal	Las Tejerías	4,289	3 ponds	Qda. El Limon	6	Not discharged	8	7	365	6
2	Guayas	Las Tejerías	3,000	2 ponds, poor function	Deep well	20	Qda. Guayas	8	7	365	4
3	Had. San Jorge	Morocopo	3,603	None exist	Deep well	40	Qda. Morocopo	8	7	365	7
4	Graiteca	Morocopo	54	3 ponds, good	Spring water	10	Not discharged	8	7	365	3
5	San Martín de Porres	Morocopo	5,500	3 ponds, poor function	Qda. El Limon	60	Qda. Morocopo	8	7	365	4
6	Ganacer	Morocopo	2,650	4 ponds	Qda. El Rosario	16	Qda. Morocopo	9	7	365	3
7	Darín	Morocopo	837	2 ponds, poor function	Qda. El Limon	5	Qda. Morocopo	8	7	365	2
8	Valle Alto	Morocopo	900	2 ponds, poor function	Qda. El Limon	6	Qda. Morocopo	12	7	365	4
9	La Milagrosa	Morocopo	1,856	3 ponds	Spring water	10	Qda. Morocopo	8	7	365	1
10	Hnos Rodriguez, C.A.	Morocopo	7,000	4 ponds, good	Qda. Agua Buena	40	Qda. Morocopo, but not discharged	8	7	365	6
11	Agropecuaria Namarda	Morocopo	4,700	2 ponds	Qda. El Limon and deep well	20	Qda. Morocopo	10	7	365	7
12	Morocopo	Morocopo	4,920	4 ponds, good	Qda. El Rosario	5	Qda. Morocopo, but not discharged	8		365	6
13	Multiflo	Morocopo	1,500	Tanks	Qda. El Limon	10	Qda. Morocopo	8		365	3
14	Granulca	Guacajipuro	2,318	3 ponds	Deep well	25	Tuy River	8	7	365	1
15	El Sacrificio	Guacajipuro	134	5 septic tanks	Deep well	1	Qda. Guayas	10	7	365	3
16	Las Mercedes	Guacajipuro	255	2 ponds, good	Spring water	6	Qda. Guayas, but not discharged	8	7	365	8
17	Agropecuaria 67	Boca de Cagua	1,400	9 tanks and 3 ponds, poor function	Spring water and deep well	5	Tuy River	8	7	365	3
18	Santa María o Fatima	Boca de Cagua	2,400	2 ponds, very poor function	Deep well	30	Tuy River	8	7	365	3
19	Agropecuaria Retamal	Retamal	768	-	-	6	Qda. Guayas	8	7	365	4
20	Agropecuaria la Fronos	Qda. Guayas	350	-	Deep well	3	Qda. Guayas	8	6	365	6

Volume of wastewater was reported as same as using water volume.

Table 1.1-3(2/2) Inventory of Piggeries

Middle Basin

No	Name	Location	Animal numbers	Treatment system	Water source	Volume of using water (tons/day)	Volume of wastewater (tons/day)	Water body receiving ww	Working hours (h/d)	Working days (d/week)	Working days (d/year)	Number of workers
21	El Marques	Taceta	7,000	2 ponds poor function	2 wells	70	50	Tuy River	8	6.5	338	11
22	Guaicupuro	Cua	300	3 ponds	-	-	-	Qda. Apamate	8	7	365	2
23	Rancho Grande	Ocumare del Tuy	2,000	Ponds	Well	10	7	Not discharged	8	7	365	3
24	Langreana	Ocumare del Tuy	3,000	Ponds	Well	10.5	9	Not discharged	10	7	365	2
25	San Bernardo	Ocumare del Tuy	1,800	3 ponds	Well	15	10	For irrigation	8	7	365	5
26	Aveirese	Ocumare del Tuy	1,500	3 ponds	Tuy River	40	30	Tuy River	8	6	312	1
27	Nichita	Ocumare del Tuy	-	3 ponds	-	-	-	Tuy River	-	7	365	-
28	Canose	Ocumare del Tuy	3,000	3 ponds	1 well	15	10	Tuy River	8	7	365	4
29	Cabrales	Ocumare del Tuy	80	2 ponds	Municipal water supply	4	3	Not discharged	8	7	365	1
30	La Chicharra	Charallave	-	None exist	-	-	-	*Qda. Cantarana	8	7	365	-
31	Las Gondolas	Charallave	4,000	None exist	Well, delivered	35	20	*Qda. Cantarana	8	7	365	6
32	La Cooperativa	Charallave	113	None exist	Delivered by tanker	3	3	Not discharged	8	7	365	3
33	La Mata	Charallave	275	2 ponds	Delivered by tanker	8	8	Not discharged	8	7	365	2

*Wastewater does not flow into Quebrada Charallave in the dry season.

Table 1.1-4 Numbers of Piggeries and Pigs, and Water Bodies receiving Wastewater

Water body and location	Treatment condition	Piggeries	Head of pigs	No discharging of wastes (tons/day)	Well treated wastes (tons/day)	None or poor treatment (tons/day)
Tuy River and Boca de Cagua	Well treated	1	2.318	-	25	-
	None or poor treatment	2	3.800	-	-	35
	No discharge of wastes	0	0	0	-	-
	Subtotal	3	6	0	25	35
Qda. Morocopo	Well treated	4	10.700	-	66	-
	None or poor treatment	4	10.800	-	-	71
	No discharge of wastes	3	12.000	85	-	-
	Subtotal	11	33.500	85	66	71
Qda. Guayas	Well treated	4	4.251	-	1	-
	None or poor treatment	0	0	-	-	29
	No discharge of wastes	2	4.544	12	-	-
	Subtotal	6	8.795	12	1	29
Subtotal in the upper basin		20	48.413	97	92	135
Tacata (Tuy River)	Well treated	0	0	-	0	-
	None or poor treatment	1	7.000	-	-	50
	No discharge of wastes	0	0	0	-	-
	Subtotal	1	7.000	0	0	50
Cua (Tarma River)	Well treated	1	300	-	7	-
	None or poor treatment	0	0	-	-	0
	No discharge of wastes	0	0	0	-	-
	Subtotal	1	300	0	7	0
Ocumare del Tuy (Tuy River)	Well treated	2+1*	4.500	-	55	-
	None or poor treatment	0	0	-	-	0
	No discharge of wastes	4	6.880	0	-	-
	Subtotal	7	11.380	0	55	0
Charallave (Qda. Cantarran)	Well treated	0	0	-	0	-
	None or poor treatment	0	0	-	-	0
	No discharge of wastes	3*1*	4.388	31	-	-
	Subtotal	4	4.388	31	0	0
Subtotal in the middle basin		13	23.068	31	55	50
Total in the basin		33	71.481	128	147	185

* 3 ponds exist in this piggery, but no information of pig numbers or treatment condition

Note: No information of good or poor about treatment efficiency, therefore in case the treatment exist it was dealt with good treatment efficiency.

Table 1.1-5 Comparison of Numbers of Piggeries and Pigs between 1988 and 1996

		Upper basin	Middle basin	Subtotal	Total
1988*	No treatment	16	14	30	
	Piggery With treatment	12	4	16	
	Subtotal	28	18	46	
	Pigs	38,000	32,000		70,000
1996	None or poor treatment	6	1	7	
	Piggery Well treated	9	4	13	
	No discharging ww	5	8	13	
	Subtotal	20	13	33	
	None or poor treatment	14,600	7,000	21,600	
	Pigs Well treated	17,269	4,800	22,069	
	No discharging ww	16,544	11,268	27,812	
	Subtotal	48,413	23,068		71,481

*: After "Diagnostico de las Fuentes de Contaminacion en la Cuenca del Rio Tuy",
E. R. Gunwald. A. (1989)

Table 1.1-6 Population and Households in Cities and Towns in the Study Area

City or Town	Population	Area (km ²)	Population density (P/km ²)	Households	Persons per household
Colonia Tovar	3,373	14.3	236	935	3.6
El Consejo	13,171	2.9	4,542	2,875	4.6
Sabaneta	14,498	6.3	2,301	3,005	4.8
Sto. Domingo and La Concepcion	2,670	2.2	1,214	613	4.4
Las Tejerias	23,819	30.4	784	5,217	4.6
Paracotos	6,068	10	607	1,490	4.1
Tacata	1,198	1.9	631	337	3.6
Cua and Las Mercedes	62,836	63.0	997	15,594	4.0
Charallave	59,939	144.1	416	14,000	4.3
Ocumare del Tuy and Colonia Mendoza	76,880	83.9	916	17,396	4.4
San Fran. de Yare and San Ant. de Yare	18,902	91.3	207	4,604	4.1
				Mean	4.2

Note: Population of most of the cities and towns include the population of surrounding rural areas (OCEI-1990).

Table 1.1-7 Population and Population Density in Sub-basin (1995)

No.	Area name	Population	Area (km ²)	Population density (P/km ²)
1	Toval and other	5,281	240.7	22
2	El Consejo, Cano Tiquirito and others	27,450	46.0	597
3	Las Tejerias, Qda. Morocopo and others	41,887	132.8	315
4	Qda. Guayas and others	4,836	106.9	45
5	Paracotos, Qda. Maitana and others	29,091	284.8	102
6	Guare River (including Tacata)	1,783	181.8	10
7	Tacata-Tazon (Sabaneta)	754	55.8	14
8	Tarma River, part of Cua and others	16,193	218.0	74
9	Charallave, part of Cua and others	143,185	357.4	401
10	Ocumare del Tuy, S. F. de Yare and other	95,399	226.8	421
	Total	365,859	1,851.0	

Table 1.1-8 Sanitary Condition

Miranda State

Population range											
		<1000	1000-2499	2500-4999	5000-9999	10000-19999	20000-49999	50000-99999	100000-499999	>500000	
Total households (x100)		4049	165	84	68	175	120	479	1232	1726	-
Type of sanitation		No. of households with sanitary service (X100)									
Flush toilet to sewer system	3168	15	16	33	50	54	366	1030	1605	-	
Flush toilet to septic tank	460	52	43	21	88	37	73	97	49	-	
Latrine	138	23	9	8	19	12	10	41	17	-	
None exists	225	71	13	5	16	15	23	49	32	-	
Not declared	58	4	3	1	2	2	7	15	23	-	

Type of sanitation	% of households with sanitary service									
	<1000	1000-2499	2500-4999	5000-9999	10000-19999	20000-49999	50000-99999	100000-499999	>500000	
Flush toilet to sewer system	78	9	19	49	29	45	76	84	93	-
Flush toilet to septic tank	11	32	51	31	50	31	15	8	3	-
Latrine	3	14	11	12	11	10	2	3	1	-
None exists	6	43	15	7	9	13	5	4	2	-
Not declared	1	2	4	1	1	2	1	1	1	-

Aragua State

Population range											
		<1000	1000-2499	2500-4999	5000-9999	10000-19999	20000-49999	50000-99999	100000-499999	>500000	
Total households (x100)		2219	84	41	38	46	149	106	404	-	1350
Type of sanitation		No. of households with sanitary service (X100)									
Flush toilet to sewer system	1654	8	8	12	27	69	58	351	-	1120	
Flush toilet to septic tank	331	34	22	17	10	44	26	20	-	158	
Latrine	117	13	5	4	5	24	13	18	-	34	
None exists	87	27	6	4	4	10	8	9	-	21	
Not declared	30	2	0.6	1	0.2	1	1	4	-	17	

Type of sanitation	% of households with sanitary service									
	<1000	1000-2499	2500-4999	5000-9999	10000-19999	20000-49999	50000-99999	100000-499999	>500000	
Flush toilet to sewer system	75	10	20	32	59	46	55	87	-	83
Flush toilet to septic tank	15	40	54	45	22	30	25	5	-	12
Latrine	5	15	12	10	11	16	12	4	-	3
None exists	4	32	14	10	9	7	8	2	-	2
Not declared	1	2	1	3	0	1	1	1	-	1

Note: Data is from OCEI-1990

Table 1.1-9 Percent of Households with Sanitary Service in Cities

Miranda State

City	Paracotos	San Fran. de Yare	Charallave	Ocumare del Tuy	Cua
Total households	1490	4604	14009	17396	15594
Type of sanitation	% of households with sanitary service				
Flush toilet to sewer system	29	45	60*	60*	88*
Flush toilet to septic tank	50	31	-	-	-
Latrine	11	10	-	-	-
None exists	9	13	-	-	-
Not declared	1	1	25	25	1

Aragua State

	Colonia Tovar	Tacata	Guacama ya	Santo Domingo	Las Tejerias	El Consejo	Sabaneta
	935	337	931	613	5217	2825	3005
Type of sanitation	% of households with sanitary service						
Flush toilet to sewer system	0	20	32	32	55	82*	84*
Flush toilet to septic tank	100*#	54	45	45	25	-	-
Latrine	-	12	10	10	12	-	-
None ex	-	14	10	10	7	-	-
Not decl	-	1	3	3	1	1	1

*: After "Updating of Environmental Investigating Project in Tuy River basin and its Influencing Area", Efrén Guedez (1994)

#: All flush toilets are connected to septic tanks or cesspool.

Table 1.2-1 Water Quality Standard in Decree No.883

Parameter	Type Sub-type	Type 1		Type 2		Discharged Water	
		1-A	1-B	2-A	2-B	to River e.t.c.	to Sewer Net
DO	(mg/l)	4.0 <	4.0 <	-	-	-	-
pH		6.0-8.5	6.0-8.5	-	-	6.0-9.0	6.0-9.0
Color (U/Pl-Co)		50>	150>	-	-	500	-
Turbidity	(NTU)	25>	250>	-	-	-	-
Fluoride	(mg/l)	1.7>	1.7>	-	-	5.0	-
Phenolic Compounds	(mg/l)	-	0.002	-	-	0.5	0.5
Total Coliforms	(MNP/100ml)	2000>	10000>	1000>	5000>	-	-
Fecal Coliforms	(MNP/100ml)	-	-	100>	1000>	-	-
BOD	(mg/l)	-	-	-	-	60	350
COD	(mg/l)	-	-	-	-	350	900
Total Suspended Solids	(mg/l)	-	-	-	-	-	1600
Suspended Solids	(mg/l)	-	-	-	-	80	400
Total Dissolved Solids	(mg/l)	1500	-	3000	-	-	-
Mineral oil	(mg/l)	0.3	-	-	-	20	20
Mineral oil and hydrocarbon	(mg/l)	-	-	-	-	20	150
Oils and greases from veg/animals	(mg/l)	-	-	-	-	20	150
Alkyl Mercury	(mg/l)	-	-	-	-	Undetec.	Undetec.
Aldehydes	(mg/l)	-	-	-	-	2.0	-
Total Aluminum	(mg/l)	0.2	-	1.0	-	5.0	5.0
Total Arsenic	(mg/l)	0.05	-	0.05	-	0.5	0.5
Total Barium	(mg/l)	1.0	-	1.0	-	5.0	5.0
Boron	(mg/l)	-	-	0.75	-	5.0	-
Total Cadmium	(mg/l)	0.01	-	0.005	-	0.2	0.2
Total Cyanide	(mg/l)	0.1	-	0.2	-	0.2	0.2
Chloride	(mg/l)	600	-	-	-	1.000	-
Total Cobalt	(mg/l)	-	-	-	-	0.5	0.5
Total Copper	(mg/l)	1.0	-	0.2	-	1.0	1.0
Total Chrome	(mg/l)	0.05	-	0.05	-	2.0	2.0
Detergents	(mg/l)	1.0	-	-	-	2.0	8.0
Dispersives	(mg/l)	1.0	-	-	-	2.0	8.0
Hardness (as CaCO3)	(mg/l)	500	-	-	-	-	-
Tin	(mg/l)	-	-	-	-	5.0	10.0
Extract of carbon at chloroform	(mg/l)	0.15	-	-	-	-	-
Total phosphorus (as P)	(mg/l)	-	-	-	-	10	10
Total Iron	(mg/l)	1.0	-	1.0	-	10	25
Total Manganese	(mg/l)	0.1	-	0.5	-	2.0	10
Total Mercury	(mg/l)	0.01	-	0.01	-	0.01	0.01
Total Nickel	(mg/l)	-	-	0.5	-	-	2.0
T-N(without NO ₂ , NO ₃)	(mg/l)	-	-	-	-	40	40
Nitrites + Nitrates	(mg/l)	10.0	-	-	-	10	-
Total Silver	(mg/l)	0.05	-	0.05	-	0.1	0.1
Total Lead	(mg/l)	0.05	-	0.05	-	0.5	0.5
Selenium	(mg/l)	0.01	-	0.01	-	0.05	0.2
Sodium	(mg/l)	200	-	-	-	-	-
Sulfates	(mg/l)	400	-	-	-	1000	400
Sulfites	(mg/l)	-	-	-	-	2.0	-
Sulfides	(mg/l)	-	-	-	-	0.5	2.0
Vanadium	(mg/l)	-	-	10.0	-	-	5.0
Zinc	(mg/l)	5.0	-	5.0	-	5.0	5.0
Temperature	(°C)	-	-	-	-	-	40
Biocides							
- Organophosphates and carbamates	(mg/l)	0.1	-	0.1	-	0.25	0.25
- Organochlorates	(mg/l)	0.2	-	0.2	-	0.05	0.05
Rdioactivity							
- Alpha activity	(Bq/l)	0.1	-	0.1	-	0.1	0.1
- Beta activity	(Bq/l)	1.0	-	1.0	-	1.0	1.0

Table 1.2-2 (1/2) Number of Sampling Sites for Water Quality Analyses during the Study Period

Parameter	Tuy River	Tributary	Sand quarry flushing water	Total
Water Discharge	10	14	-	24
Odor	10	14	-	24
Color	10	14	-	24
Water Temperature	10	14	-	24
pH	10	14	-	24
EC	10	14	-	24
DO	10	14	-	24
BOD	10	14	-	24
COD	10	14	-	24
TOC	10	14	-	24
SS	10	14	-	24
Turbidity	10	14	-	24
TN	10	14	-	24
TP	10	14	-	24
NH4	10	14	-	24
NO2+3	10	14	-	24
PO4	10	14	-	24
N-Hexane Extract	10	14	-	24
Hg	10	-	-	10
As	10	-	-	10
Cd	10	-	-	10
Pb	10	14	-	24
Se	10	-	-	10
Cr	10	14	-	24
Cu	10	14	-	24
Zn	10	14	-	24
Ni	10	14	-	24
TS	10	14	-	24
VS	10	14	-	24
VSS	10	14	-	24
Total Coliform	10	14	-	24
Fecal Coliform	10	14	-	24
Cl	10	14	-	24
Sedimentation test	12	6	1	19

Table 1.2-2 (2/2) Number of Sampling Sites for Water Quality Analyses during the Study Period

Parameter	Industrial Wastewater			Livestock Wastewater	Domestic Wastewater	Total
	Non-food	Industrial Area	Food			
Water Discharge	26	4	17	13	10	70
Odor	26	4	17	13	10	70
Color	26	4	17	13	10	70
Water temperature	26	4	17	13	10	70
pH	26	4	17	13	10	70
EC	26	4	17	13	10	70
BOD	26	4	17	13	10	70
COD	26	4	17	13	10	70
TOC	26	4	17	13	10	70
SS	26	4	17	13	10	70
Turbidity	26	4	17	13	10	70
TN	26	4	17	13	10	70
TP	26	4	17	13	10	70
NH ₄	26	4	17	13	10	70
NO ₂₊₃	26	4	17	13	10	70
PO ₄	26	4	17	13	10	70
N-Hexane Extract	26	4	17	13	-	60
Hg	26	4	-	-	-	30
As	26	4	-	-	-	30
Cd	26	4	-	-	-	30
Pb	26	4	-	-	-	30
Se	26	4	-	-	-	30
Cr	26	4	-	-	-	30
Cu	26	4	-	13	-	43
Zn	26	4	-	13	-	43
Ni	26	4	-	-	-	30

Table 1.2-3 (1/2) Results of water Quality Analyses for the Tuy River

Point Number Sampling Site	R-1	R-2	R-3	R-4	R-5
	Las Caballerizas	70 m despues de Tiquirito	Aguas abajo Q. Morocopo	Autop Tejerias via-Tiara	Boca de Cagua
Date	21/2/96	21/2/96	21/2/96	22/2/96	23/2/96
Water Flow (l/s)	115	157	274	318	330
Odor	S/O	Putrefacto	Putrefacto	Cloacal	Cloacal
Color	S/O	Marron	Marron	Marron	Negro
Water Temperature (°C)	27.2	28.1	32	28.3	24
Air Temperature (°C)	26	27	33	30	24
pH	7.5	7.4	7.3	8.2	7.7
EC (mS/cm)	0.389	1.387	1.335	1.650	1.643
DO (mg/l)	9.2	0	0	0	0.0
Turbidity (NTU)	6.3	210	118	210	148
BOD (mg/l)	1	720	264	570	690
COD (mg/l)	15	1795	769	1327	1,442
SS (mg/l)	19	800	494	1196	988
T-N (mg/l)	1	45	28	57	55
(without NO3+NO2)					
NH4-N (mg/l)	0.05	20	16	28	43.0
NO2-N + NO3 (mg/l)	1.59	1.46	N.D.	N.D.	N.D.
T-P (mg/l)	0.05	1.78	3.50	4.95	5.90
D PO4-P (mg/l)	0.05	1.11	3.25	4.85	5.20
n-Hexane (mg/l)	<1	<1	4	24	10
TS (mg/l)	332	2,500	1,584	2,420	2,080
VS (mg/l)	64	1,220	736	1,172	808
VSS (mg/l)	12	656	469	764	112
Total Coli. (MPN/100ml)	1.7E+04	5.0E+06	3.0E+06	3.0E+07	1.6E+08
Fecal Coli. (MPN/100ml)	7.0E+03	5.0E+06	3.0E+06	1.7E+07	1.6E+08
Cl (mg/l)	6	151	103	104	162
TOC (mg/l)	ND	717	268	465	463
Pb (ug/l)	<250	<250	<250	<250	<250
Cr (ug/l)	<50	<50	<50	75	128
Cu (ug/l)	<50	140	180	100	140
Zn (ug/l)	39	73	259	2,600	227
Ni (ug/l)	<50	200	100	133	111
Hg (ug/l)	3.8	10.8	5.5	3.7	4.8
As (ug/l)	ND	ND	ND	ND	ND
Cd (ug/l)	BLD	BLD	BLD	BLD	BLD
Se (ug/l)	ND	ND	ND	ND	ND
Note:					

Table 1.2-3 (2/2) Results of water Quality Analyses for the Tuy River

Point Number Sampling Site	R-6	R-7	R-8	R-9	R-10
	Hda. Tazon de Cua	Puente Marin de Cua	Colonia Mendoza	De Bajo Pte. ocumare	Puente de San Antonio
Date	26/2/96	26/2/96	27/2/96	29/2/96	29/2/96
Water Flow (l/s)	905	1,074	957	3945	4412
Odor	S/O	S/O	S/O	S/O	S/O
Color	Marron	Marron claro	Marron claro	Marron claro	Marron claro
Water Temperature (°C)	24.4	25.8	26.8	24.4	25.8
Air Temperature (°C)	24	25	27	28	30
pH	7.9	8.04	7.93	8.08	8.09
EC (mS/cm)	0.820	0.829	0.768	0.506	0.510
DO (mg/l)	3.9	5.2	3.4	4.2	4.4
Turbidity (NTU)	165.5	145.7	310	80.2	24
BOD (mg/l)	32	37	30	8	7
COD (mg/l)	40	85	67	17	30
SS (mg/l)	316	258	690	114	112
T-N (mg/l)	10	9	8	2.5	1.7
(without NO3+NO2)					
NH4-N (mg/l)	8.9	6.9	5.8	1.20	0.33
NO2-N + NO3 (mg/l)	4.34	7.44	1.82	3.60	6.20
T-P (mg/l)	0.74	0.82	0.78	0.30	0.62
D PO4-P (mg/l)	0.70	0.60	0.63	0.29	0.42
n-Hexane (mg/l)	4	2	1	<1	<1
TS (mg/l)	800	746	1,246	448	416
VS(mg/l)	352	298	178	92	96
VSS (mg/l)	152	126	114	36	32
Total Coli. (MPN/100ml)	3.0E+05	5.0E+05	1.1E+05	1.1E+04	5.0E+04
Fecal Coli. (MPN/100ml)	3.0E+05	5.0E+05	5.0E+04	5.0E+03	1.7E+04
Cl (mg/l)	43	41	47	28	30
TOC (mg/l)	74	75	68	36.2	40.5
Pb (ug/l)	<250	<250	<250	<250	<250
Cr (ug/l)	<50	<50	58	<50	<50
Cu (ug/l)	80	100	120	90	90
Zn (ug/l)	80	68	84	52	82
Ni (ug/l)	177	111	177	133	155
Hg (ug/l)	11.4	11.0	12.0	8.4	4.9
As (ug/l)	ND	ND	ND	ND	ND
Cd (ug/l)	BLD	BLD	BLD	BLD	BLD
Se (ug/l)	ND	ND	ND	ND	ND
Note:			Other canal Q=760 l/s		

Table 1.2-4 (1/2) Results of Water Quality Analyses for Tributaries

Point Number Sampling Site	T-1	T-2	T-3	T-4	T-5	T-6
	Cano Tiquirito	Quebrada Morocopo	Rio Cagua	Rio Guare	Quebrada Aniagua	Rio Tarma (Nueva Cua)
Date	21/2/96	21/2/96	23/2/96	23/2/96	27/2/96	26/2/96
Water Flow (l/s)	108	33	53	284	51	177
Odor	Putrefacto	Putrefacto	S/O	S/O	S/O	S/O
Color	Marron	Gris oscuro	S/O	S/C	S/C	S/C
Water Temperature (°C)	26.6	29.2	24.1	26.4	23.7	29.5
Air Temperature (°C)	28	33	25	29	28	29
pH	7.8	7.0	7.65	8.39	8.36	8.23
EC (mS/cm)	2.270	0.905	0.348	0.335	0.393	0.308
DO (mg/l)	0.0	0.6	7.5	7.4	6.7	6.3
Turbidity (NTU)	200	245	8	3.2	2.7	2.7
BOD (mg/l)	840	126	5	2	<1	2
COD (mg/l)	2,205	820	39	4	4	9
SS (mg/l)	780	1,116	24	10	8	8
T-N (mg/l)	62	73	1	1	0.6	1
(without NO3+NO2)						
NH4-N (mg/l)	20.00	67.00	0.22	0.14	0.06	0.22
NO2-N + NO3 (mg/l)	ND	ND	0.53	0.13	0.04	0.27
T-P (mg/l)	2.87	11.25	0.09	0.06	0.04	0.07
D PO4-P (mg/l)	1.22	11.00	0.03	0.04	0.04	0.07
n-Hexane (mg/l)	2	2	10	6	1	7
TS (mg/l)	2,808	1,656	268	298	446	164
VS (mg/l)	1,436	720	80	210	74	120
VSS (mg/l)	740	616	20	66	10	24
Total Coli. (MPN/100ml)	1.7E+06	3.0E+06	2.4E+04	1.7E+04	9.0E+04	1.1E+04
Fecal Coli. (MPN/100ml)	7.0E+05	3.0E+06	1.3E+04	5.0E+03	3.0E+03	1.1E+04
Cl (mg/l)	137	23	9	8	3	14
TOC (mg/l)	844	254	23	20.6	34.1	20.6
Pb (ug/l)	<250	<250	<250	<250	<250	<250
Cr (ug/l)	<50	<50	<50	<50	<50	<50
Cu (ug/l)	160	240	80	<50	<50	<50
Zn (ug/l)	80	1,300	173	41	39	57
Ni (ug/l)	133	110	<50	<50	<50	<50
Hg (ug/l)						
As (ug/l)						
Cd (ug/l)						
Se (ug/l)						
Note:						

Table 1.2-4 (2/2) Results of Water Quality Analyses for Tributaries

Point Number Sampling Site Date	T-7	T-8	T-11	T-12	T-13	T-14
	Rio Ocumarito	Rio Sucuta	Quebrada Chorreron	Quebrada Guayas	Quebrada Maitana	Quebrada Charallave
	27/2/96	29/2/96	22/2/96	22/2/96	23/2/96	28/2/96
Water Flow (l/s)	2515	133	28	25	54	184
Odor	S/O	S/O	Cloacal	Cloacal	S/O	S/O
Color	S/C	S/C	Negro	Negro	Amarillo	Claro
Water Temperature (°C)	25.8	24.5	28.5	30.1	25	29.3
Air Temperature (°C)	28	27	29	32	27	30
pH	8.17	8.64	7.1	7.5	8.05	8.19
EC (mS/cm)	0.264	0.392	1.350	2.130	0.815	1.227
DO (mg/l)	7.2	7.2	0.3	0.1	5.8	3.7
Turbidity (NTU)	12.6	2.5	235	235	14,800	6.2
BOD (mg/l)	2	2	186	1,740	21	9
COD (mg/l)	18	4	336	4,189	413	37
SS (mg/l)	28	8	696	2,360	32,006	19
T-N (mg/l)	1	1.2	29	250	16	5
(without NO ₃ +NO ₂)						
NH ₄ -N (mg/l)	0.13	0.1	18	247.00	1.39	3.8
NO ₂ -N + NO ₃ (mg/l)	0.66	0.13	0.09	N.D.	3.99	10.4
T-P (mg/l)	0.02	0.07	2.04	5.80	0.05	1.48
D PO ₄ -P (mg/l)	<0.01	0.06	0.82	5.15	0.05	1.43
n-Hexane (mg/l)	<1	2	12	228	4	8
TS (mg/l)	248	240	1,508	3,384	35,582	860
VS (mg/l)	16	56	316	2,416	1,547	228
VSS (mg/l)	8	12	292	1,908	1,026	104
Total Coli. (MPN/100ml)	1.7E+04	5.0E+03	2.4E+07	2.4E+07	1.3E+07	3.0E+06
Fecal Coli. (MPN/100ml)	3.0E+03	5.0E+02	2.4E+07	2.4E+07	5.0E+06	1.3E+06
Cl (mg/l)	8	11	62	66	32	123
TOC (mg/l)	4.9	27.5	133.0	810	230	42.9
Pb (ug/l)	<250	<250	<250	<250	<250	<250
Cr (ug/l)	<50	<50	<50	<50	<50	<50
Cu (ug/l)	<50	60	80	80	300	<50
Zn (ug/l)	32	80	109	103	208	75
Ni (ug/l)	<50	<50	155	100	244	<50
Hg (ug/l)						
As (ug/l)						
Cd (ug/l)						
Se (ug/l)						
Note:						

Table 1.2-5 (1/4) Results of Water Quality Analyses for Food related Factories

Point Number Sampling Site	F-1	F-1.before	F-2	F-3	F-3.before
	Ron Santa Teresa	Ron Santa Teresa	Monseratina	Proagro	Proagro
	(Outlet) (after Dilution)	(before Treatment)	(Outlet)	(Outlet)	(before Treatment)
Date	6/3/96	6/3/96	12/3/96	12/3/96	12/3/96
Water Flow (l/s)	8.9		0.9	62.5	
Odor	A Vinaza	A Vinaza	A sangre	S/O	A sangre
Color	Marron	Marron	Rojo	S/C	Rojo
Water Temperature (°C)	29	71	27	23.9	26
Air Temperature (°C)	32	31	27	27	27
pH	7.9	5.37	7.7	7.63	7.5
EC (mS/cm)	6.24	Ver planilla	4.63	1.99	1.71
Turbidity (NTU)	2800	10.5	179.4	14.3	634
BOD (mg/l)	6,000	67,200	1,260	14	4,320
D-BOD (mg/l)	2,820	37,200	555		810
COD (mg/l)	6,794	110,361	1,637	73	2,131
D-COD (mg/l)	6,408	79,680	708		
SS (mg/l)	2,852	14,700	119	3	1,630
T-N (mg/l)	252	455	87	3	126
(without NO3+NO2)					
NH4-N (mg/l)	0.20	6.40	45.00	0.51	72.00
NO2-N + NO3 (mg/l)	<0.01	<0.01	0.02	3.40	0.03
T-P (mg/l)	7.70	9.00	9.40	7.40	10.80
D PO4-P (mg/l)	0.28	8.50	6.20	4.30	9.20
n-Hexane (mg/l)	6	8	116	9	3
Total Coli. (MPN/100ml)					
Fecal Coli. (MPN/100ml)					
Cl (mg/l)					
TOC (mg/l)	3,917	38,240	419	21	773
Pb (ug/l)					
Cr (ug/l)					
Cu (ug/l)					
Zn (ug/l)					
Ni (ug/l)					
Hg (ug/l)					
As (ug/l)					
Cd (ug/l)					
Se (ug/l)					
Note:					

Table 1.2-5 (2/4) Results of Water Quality Analyses for Food related Factories

Point Number Sampling Site	F-4	F-4.before	F-5	F-6	F-8	F-8.before
	Savoy (Outlet)	Savoy (before Treatment)	Beneficiador (Outlet)	Savoy (Outlet)	Ilamaca (Outlet)	Ilamaca (before Treatment)
Date	14/3/96	14/3/96	15/3/96	21/3/96	19/3/96	19/3/96
Water Flow (l/s)	6.9		3.7	1.2	1	
Odor	A grasa		Fecal	Cloacal	A grasa	A grasa
Color	Marron	Naranja	Marron	Blanco	Gris claro	Blanco Claro
Water Temperature (°C)	28	39	39	30	30	26
Air Temperature (°C)	23.5	23.1	33	30	34.5	34.5
pH	7.1	6.2	7.87	7.59	7.87	7.12
EC (mS/cm)	0.729	0.395	2.305	0.609	3.73	1.449
Turbidity (NTU)	39.8	84.7	474	150	35.3	115
BOD (mg/l)	34	1,920	1,240	510	14	300
D-BOD (mg/l)						
COD (mg/l)	32	4,133	4,100	897	143	376
D-COD (mg/l)						
SS (mg/l)	216	1,063	1,516	171	188	288
T-N (mg/l)	5	1	300		3	8
(without NO3+NO2)						
NH4-N (mg/l)	0.13	0.03	288.00	1.00	0.65	2.10
NO2-N + NO3 (mg/l)	0.08	0.04	<0.0	0.09	0.04	0.44
T-P (mg/l)	0.17	0.68	34.50	3.75	23.00	2.08
D PO4-P (mg/l)	0.03	0.10	12.63	1.65	23.00	1.20
n-Hexane (mg/l)	25	20	14	13	24	44
Total Coli. (MPN/100ml)						
Fecal Coli. (MPN/100ml)						
Cl (mg/l)						
TOC (mg/l)	43	1,559			50	
Pb (ug/l)						
Cr (ug/l)						
Cu (ug/l)						
Zn (ug/l)						
Ni (ug/l)						
Hg (ug/l)						
As (ug/l)						
Cd (ug/l)						
Se (ug/l)						
Note:						

Table 1.2-5 (3/4) Results of Water Quality Analyses for Food related Factories

Point Number Sampling site	F-9	F-9 before	F-10	F-110	F-11
	United Distiller (Outlet)	United Distiler (before Treatment)	Avicola La Mora (Outlet)	Avicola La Mora (before Treatment)	Prove Gran (Outlet)
Date	19/3/96	19/3/96	28/3/96	28/3/96	29/3/96
Water Flow (l/s)	11.1		6.3		2.3
Odor	A cloro	Cloacal	A sangre	A sangre	Putrefacto
Color	S/C	Turbio	Marron claro	A rojizo	Vende Grif
Water Temperature (°C)	24	42	26	23	33
Air Temperature (°C)	32	32	33	33	34
pH	7.45	7.12	7.07	7.30	7.86
EC (mS/cm)	1.18	0.322			
Turbidity (NTU)	33.8	43.5	120	110	420
BOD (mg/l)	5	288	185	315	3,025
D-BOD (mg/l)					
COD (mg/l)	58	413	335	765	2,650
D-COD (mg/l)					
SS (mg/l)	228	256	68	179	508
T-N (mg/l)	2	11	58	98	614
(without NO3+NO2)					
NH4-N (mg/l)	0.03	4.80	138.00	207.00	612.00
NO2-N + NO3 (mg/l)	22.57	0.13	1.90	2.10	<0.01
T-P (mg/l)	0.12	0.76	6.80	15.75	38.00
D PO4-P (mg/l)	0.06	0.04	4.70	10.20	37.50
n-Hexane (mg/l)	8	<1	7	5	33
Total Coli. (MPN/100ml)					
Fecal Coli. (MPN/100ml)					
Cl (mg/l)					
TOC (mg/l)	28.4				
Pb (ug/l)					
Cr (ug/l)					
Cu (ug/l)					
Zn (ug/l)					
Ni (ug/l)					
Hg (ug/l)					
As (ug/l)					
Cd (ug/l)					
Se (ug/l)					
Note:					

Table 1.2-5 (4/4) Results of Water Quality Analyses for Food related Factories

Point Number Sampling Site	F-1.process
	Ron Santa Teresa (after Treatment) (before Dilution)
Date	6/3/96
Water Flow (l/s)	8
Odor	A Vinaza
Color	Marton
Water Temperature (°C)	32
Air Temperature (°C)	32
pH	7.93
EC (mS/cm)	8.9
Turbidity (NTU)	32.5
BOD (mg/l)	2,220
D-BOD (mg/l)	1,200
COD (mg/l)	11,496
D-COD (mg/l)	7,436
SS (mg/l)	2,453
T-N (mg/l)	436
(without NO ₃ +NO ₂)	
NH ₄ -N (mg/l)	66.00
NO ₂ -N + NO ₃ (mg/l)	<0.01
T-P (mg/l)	25.00
D PO ₄ -P (mg/l)	4.65
n-Hexane (mg/l)	6
Total Coli. (MPN/100ml)	
Fecal Coli. (MPN/100ml)	
Cl (mg/l)	
TOC (mg/l)	3,395
Pb (ug/l)	
Cr (ug/l)	
Cu (ug/l)	
Zn (ug/l)	
Ni (ug/l)	
Hg (ug/l)	
As (ug/l)	
Cd (ug/l)	
Se (ug/l)	
Note:	20% of F-1.process to Sugar Cane

Table 1.2-6 (1/5) Results of Wastewater Analyses for Non-food related Factories

Point Number Sampling Site	N-11 Teneria (Outlet)	N-12 Arenera Paracoto (Outlet)	N-15 Textilana (Outlet)	N-16 Vengrif (Outlet)	N-17 Induvar (Outlet)
Date	11/3/96	11/3/96	12/3/96	13/3/96	12/3/96
Water Flow (l/s)	1.9	25	13	1.3	0.3
Odor		Tierra	S/O	S/O	A locion
Color	Marron	Marron	Azul oscuro	Verde claro	Gris claro
Water Temperature (°C)	31	30	30	26	30
Air Temperature (°C)	27	26	27	26	29
pH	7.25	7.8	10.4	8.9	7.26
EC (mS/cm)	5.82	0.853	6.91	1.997	0.764
Turbidity (NTU)		19,600	53.4	22.2	256
BOD (mg/l)	680		38	105	531
D-BOD (mg/l)			18		
COD (mg/l)	891	456	31	388	664
D-COD (mg/l)					
SS (mg/l)	299	15,180	162	56	72
T-N (mg/l)	143	4	2.2	8	11.4
(without NO3+NO2)					
NH4-N (mg/l)	123.00	2.41	0.07	5.26	8.23
NO2-N + NO3 (mg/l)	2.35	5.85	0.81	10.99	0.05
T-P (mg/l)	0.15	0.01	0.04	0.08	0.90
D PO4-P (mg/l)	0.15	0.03	0.01	0.02	0.28
n-Hexane (mg/l)	10	4	2	4	125
TOC (mg/l)	284		41	35.9	198
Pb (ug/l)	<250	<250	<250	<250	<250
Cr (ug/l)	5,666	<50	<50	4,667	<50
Cu (ug/l)	16	105	<50	4,600	<50
Zn (ug/l)	163	185	62.5	375	87.5
Ni (ug/l)	186	116	69	3,767	<50
Hg (ug/l)	1.9	4.8	1.5	1.4	4.1
As (ug/l)	BLD	BLD	BLD	BLD	BLD
Cd (ug/l)	ND	BLD	BLD	BLD	BLD
Se (ug/l)	BLD	BLD	BLD	BLD	BLD
Fe (ug/l)	26,080				
Note:					

Table 1.2-6 (2/5) Results of Wastewater Analyses for Non-food related Factories

Point Number Sampling Site	N-18 Mack de Vezuela (Outlet)	N-18.before Mack de Vezuela (before Treat.)	N-21 Alumbra (Outlet)	N-23 Apalanchados Rey David (Outlet)	N-26 Madosa (Outlet)	N-26.before Madosa (before Trea.)
Date	12/3/96	12/3/96	13/3/96	8/3/96	8/3/96	8/3/96
Water Flow (l/s)	0.5		0.5		3.1	
Odor	S/O	S/O	S/O	A detergente	S/O	A acido
Color	S/C	Blanco	Blanco	Azul	S/C	Marron
Water Temperature (°C)	29	36	29	35	28	28
Air Temperature (°C)	29	31	28	29	30	30
pH	9.29	5.63	4.5	10.9	8	4
EC (mS/cm)	1.972	2.6	1.439	0.615	1.378	1.126
Turbidity (NTU)	15.9	43.2	26.4	81	9	34
BOD (mg/l)	20	20	2	*	4	10
D-BOD (mg/l)	11	12		*	2	8
COD (mg/l)	100	166	81	473	10	58
D-COD (mg/l)						
SS (mg/l)	316	190	100	184	92	214
T-N (mg/l)	4.1	15.4	3	4	1	1
(without NO3+NO2)						
NH4-N (mg/l)	0.70	11	2.84	0.66	0.54	0.67
NO2-N + NO3 (mg/l)	4.96	2.72	0.22	2.35	1.86	0.23
T-P (mg/l)	1.05	650	0.02	0.80	<0.01	0.05
D PO4-P (mg/l)	0.55	700	0.02	0.35	<0.01	0.05
n-Hexane (mg/l)	<1	8	6	14	16	<1
TOC (mg/l)	66.1	44.4	6.3	117	7.1	12.7
Pb (ug/l)	<250	<250	<250	<250	<250	<250
Cr (ug/l)	<50	<50	<50	<50	<50	333
Cu (ug/l)	<50	63	<50	84	64	168
Zn (ug/l)	90	1,915	82.5	60	65	83
Ni (ug/l)	255	20,837	1,800	200	<50	465
Hg (ug/l)	3.3	3.8	1.7	BLD	1.4	1.7
As (ug/l)	10	BLD	BLD	BLD	BLD	BLD
Cd (ug/l)	BLD	BLD	ND	ND	BLD	BLD
Se (ug/l)	BLD	BLD	BLD	BLD	BLD	BLD
Fe (ug/l)	200	1,170	800		390	33,470
Note				The BOD for N-23 presented Interference		

Table 1.2-6 (3/5) Results of Wastewater Analyses for Non-food related Factories

Point Number Sampling Site	N-27 Inca (Outlet)	N-27.before Inca (before Treat.)	N-31 Dexalum (Outlet)	N-34 ABB (Outlet)	N-34.before ABB (before Treat.)
Date	15/3/96	15/3/96	19/3/96	18/3/96	18/3/96
Water Flow (l/s)	0.9		0.1	92.6	
Odor	S/O	Cloacal	S/O	S/O	A oxido
Color	Gris claro	Gris claro	Violeta	S/C	Marron claro
Water Temperature (°C)	27	40	28	29	24.9
Air Temperature (°C)	34.5	34.5	32	27	32.8
pH	7.14	7.43	7.75	7.56	1.69
EC (mS/cm)	0.596	0.55	0.338	130	36
Turbidity (NTU)	92.5	45.5	20.8	12.8	52.5
BOD (mg/l)	*	150	*	**	16
COD (mg/l)	317	428	11	**	754
SS (mg/l)	280	92	160	**	522
T-N (mg/l) (without NO3+NO2)		40	3	Interference	659
NH4-N (mg/l)	16.60	36.00	0.09	**	1.10
NO2-N + NO3 (mg/l)	3.50	0.02	23.70	**	0.18
T-P (mg/l)	2.85	0.89	0.18	*	*
D PO4-P (mg/l)	2.65	0.35	0.13	*	*
n-Hexane (mg/l)	9	19	1	**	5
TOC (mg/l)				**	
Pb (ug/l)	<250	<250	<250	**	7,270
Cr (ug/l)	90	<50	<50	**	1,100
Cu (ug/l)	80	100	<50	**	3,900
Zn (ug/l)	48	48	1,029	**	2,543
Ni (ug/l)	<50	<50	<50	**	697
Hg (ug/l)	5	1	1.6	**	9.9
As (ug/l)	BLD	11	BLD	**	29
Cd (ug/l)	BLD	BLD	BLD	**	BLD
Se (ug/l)	BLD	BLD	BLD	**	BLD
Fe (ug/l)		-	-	**	698
Note	The BOD for N-27 presented Interference		The BOD for N-31,N-34,N-34.before and T-P for N-34,N-34.before presented Interference		

Table 1.2-6 (4/5) Results of Wastewater Analyses for Non-food related Factories

Point Number Sampling Site	N-35	N-35.before	N-36	N-39	N-40	N-40.before
	Textiles La Fila (Outlet)	Textiles La Fila (before Treat)	Faaca (Outlet)	Metalmecanica (Outlet)	Infra Division (Outlet)	Infra Division (before Treat)
Date	20/3/96	20/3/96	19/3/96	22/3/96	20/3/96	20/3/96
Water Flow (l/s)	7.9		2.2	0.001	1.4	
Odor	S/O	S/O	S/O		S/O	S/O
Color	Verde	S/C	S/C	S/C	Gris Claro	Gris claro
Water Temperature (°C)	39	37	30	28	27	28
Air Temperature (°C)	31	32.5	33.5	31	31.5	31
pH	11.71	5.22	3.11	9.14	7.85	7.82
EC (mS/cm)	6.15	0.924	1.735	0.98	0.717	0.296
Turbidity (NTU)	107.5	19	15.5	20.6	125.8	52.5
BOD (mg/l)	177	635	168	13	54	42
D-BOD (mg/l)						
COD (mg/l)	547	714	444	52	280	120
D-COD (mg/l)						
SS (mg/l)	224	40	372	28	8	8
T-N (mg/l)	2	2	1	1	30	1
(without NO3+NO2)						
NH4-N (mg/l)	0.41	0.05	0.03	0.02	29.90	0.03
NO2-N + NO3 (mg/l)	<0.01	0.09	<0.01	<0.01	0.09	0.90
T-P (mg/l)	8.60	10.00	828.00	28.00	6.90	3.40
D PO4-P (mg/l)	1.70	6.50	720.00	25.50	5.10	2.15
n-Hexane (mg/l)	34	24	31	4	31	24
TOC (mg/l)			144	25		
Pb (ug/l)	<250	<250	<250	<250	<250	<250
Cr (ug/l)	**	<50	1300	157	177	<50
Cu (ug/l)	<50	70	180	<50	<50	<50
Zn (ug/l)	**	200	457	1,300	400	500
Ni (ug/l)	<50	<50	116	<50	<50	<50
Hg (ug/l)	BR (?)	1.7	1	BR (?)	BR (?)	2.9
As (ug/l)	10	BLD	19	14	BLD	11
Cd (ug/l)	41	BLD	BLD	BLD	BLD	BLD
Se (ug/l)	BLD	BLD	BLD	BLD	BLD	BLD
Fe (ug/l)						
Note:						

able 1.2-6 (5/5) Results of Wastewater Analyses for Non-food related Factories

Point Number Sampling Site	N-41	N-41 before	N-42	N-42 before
	Textiles Como --NO.1 line-- (Outlet) Date 14/3/96	Textiles Como --NO.1 line-- (before Treat.) 14/3/96	Textiles Como --NO.2 line-- (Outlet) 14/3/96	Textiles Como --NO.2 line-- (before Treat.) 14/3/96
Water Flow (l/s)	20%	20%	80%	80%
Odor	A cloro	S/O	S/O	S/O
Color	Gris claro	Gris	S/C	S/C
Water Temperature (°C)	28	45	37	30
Air Temperature (°C)	28	30	30	30
pH	8.63	9.14	8.85	8.27
EC (mS/cm)	1.857	1.742	2.22	1.562
Turbidity (NTU)	128.6	99.4	35.6	17.5
BOD (mg/l)	192	*	*	*
D-BOD (mg/l)				
COD (mg/l)	3,242	4,035	376	184
D-COD (mg/l)				
SS (mg/l)	324	456	224	192
T-N (mg/l) (without NO ₃ +NO ₂)	9	14	15	7
NH ₄ -N (mg/l)	1.7	1.30	1.70	0.05
NO ₂ -N + NO ₃ (mg/l)	0.2	0.12	0.20	0.13
T-P (mg/l)	2.58	1.55	1.25	2.48
D PO ₄ -P (mg/l)	1.2	0.75	<0.01	1.24
n-Hexane (mg/l)	14	16	9	3
TOC (mg/l)	146	177	144	87.5
Pb (ug/l)	<250	<250	<250	<250
Cr (ug/l)	<50	200	150	150
Cu (ug/l)	100	<50	100	<50
Zn (ug/l)	83	248	△2228	40
Ni (ug/l)	98	80	100	139
Hg (ug/l)	2.8	2.5	2.6	2.7
As (ug/l)	BLD	BLD	BLD	11
Cd (ug/l)	BLD	BLD	BLD	ND
Se (ug/l)	0.5	BLD	BLD	BLD
Fe (ug/l)				
Note	The BOD for N-41 before, N-42, N-42 before presented Interference			

Table 1.2-7 (1/3) Results of Water Quality Analyses for Piggeries

Point Number Sampling Site	P-3	P-3.before	P-5	P-5.before	P-6
	Granja El Marquez (Outlet)	Granja El Marquez (before Treat.)	Granja Las Guayas (Outlet)	Granja Las Guayas (before Treat.)	Granja Santa Maria (Outlet)
Date	1996/3/25	1996/3/25	29/3/96	29/3/96	29/3/96
Water Flow (l/s)					
Odor	A cochinera	A cochinera	A cochinera	A cochinera	A cochinera
Color	Gris oscuro	Gris oscuro	Marron	Marron	Gris oscuro
Water Temperature (°C)	30	30	24	24	29
Air Temperature (°C)	29	29	30	30	29
pH	7.45	8.37	8.4	7.57	7.52
EC (mS/cm)	6.43	3.42		0.394	
Turbidity (NTU)	2550	17500	235	4,800	4,500
BOD (mg/l)	2,700	3,495	116	3,100	3,393
COD (mg/l)	5,873	15,554	896	13,705	9,800
SS (mg/l)	2,650	8,722	146	5,870	4,643
T-N (mg/l)	798	603	728	1,082	756
(without NO3+NO2)					
NH4-N (mg/l)	732	255	725	760	696
NO2-N + NO3 (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01
T-P (mg/l)	122.5	250	28.50	290.00	102.50
D PO4-P (mg/l)	19	24.5	7.10	4.70	70.00
n-Hexane (mg/l)	9	14	1,752	7	31
TOC (mg/l)					
Pb (ug/l)					
Cr (ug/l)					
Cu (ug/l)	3,200	3,100	400	1,900	164
Zn (ug/l)	2,045	4,600	3,181	3,182	3,600
Ni (ug/l)					
Hg (ug/l)					
As (ug/l)					
Cd (ug/l)					
Se (ug/l)					
Note					

Table 1.2-7 (2/3) Results of Water Quality Analyses for Piggeries

Point Number Sampling Site	P-7.before Granja Morocopo (before Treat.)	P-8 Hermanos Rodriguez (Outlet)	P-8.before Hermanos Rodriguez (before Treat.)	P-9 Granja La Milagrosa (Outlet)	P-11 San Jorge (Outlet)
Date	28/3/96	27/3/96	27/3/96	28/3/96	27/3/96
Water Flow (l/s)	3.5				
Odor	A cochinera	A cochinera	A cochinera	A cochinera	A cochinera
Color	Marron	Marron	Marron	Marron	Marron
Water Temperature (°C)	26	24	25	24	26
Air Temperature (°C)	32	29	29	34	32
pH	7.76	8.2	7.91	8.25	7.9
EC (mS/cm)		3.95	0.579		2.53
Turbidity (NTU)	28,600	179.7	326,000	654	16,250
BOD (mg/l)	7,200	47	8,976	99	8,100
COD (mg/l)	10,840	640	20,800	797	12,960
S S (mg/l)	11,750	81	22,625	574	4,643
T-N (mg/l)	1,099	652	1624	299	1,309
(without NO3+NO2)					
NH4-N (mg/l)	880.00	531.00	1410.00	271.00	996.00
NO2-N + NO3 (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01
T-P (mg/l)	470.00	54.00	405.00	40.00	265.00
D PO4-P (mg/l)	470.00	33.00	55.00	19.50	195.00
n-Hexane (mg/l)	28	2	11	7	85
FOC (mg/l)					
Pb (ug/l)					
Cr (ug/l)					
Cu (ug/l)	1400	200	5800	200	5,600
Zn (ug/l)	3364	227	2455	3,364	3,545
Ni (ug/l)					
Hg (mg/l)					
As (ug/l)					
Cd (ug/l)					
Se (ug/l)					
Note:					

Table 1.2-7 (3/3) Results of Water Quality Analyses for Piggeries

Point Number Sampling Site	P-13 Granja STN. Bernardo (Outlet)	P-13.before Granja STN. Bernardo (before Treat.)	P-27 Granja Porcina Las Gandolas (Outlet)
Date	1996/4/2	1996/4/2	1996/3/26
Water Flow (l/s)			2.5
Odor	A cochinera	A cochinera	A cochinera
Color	Verde Aceit	Gris oscuro	Gris oscuro
Water Temperature (°C)	31	31	28
Air Temperature (°C)	34	34	28
pH	8.47	7.37	7.74
EC (mS/cm)	5.75	6.3	0.752
Turbidity (NTU)	1,280	14,200	12,200
BOD (mg/l)	1,170	10,800	9,250
COD (mg/l)	1,832	11,049	23,680
SS (mg/l)	333	5,900	3,850
T-N (mg/l)	940	980	1,649
(without NO3+NO2)			
NH4-N (mg/l)	806	818	1466
NO2-N + NO3 (mg/l)	<0.01	<0.01	<0.01
T-P (mg/l)	18.83	197.5	445.00
D PO4-P (mg/l)	1.7	26.5	295.00
n-Hexane (mg/l)	7	27	29
TOC (mg/l)			
Pb (ug/l)			
Cr (ug/l)			
Cu (ug/l)	300	4,300	14,320
Zn (ug/l)	273	2,136	5,900
Ni (ug/l)			
Hg (ug/l)			
As (ug/l)			
Cd (ug/l)			
Se (ug/l)			
Note			

Table 1.2-8 (1/2) Results of Water Quality Analyses for Domestic Wastewater

Point Number Sampling Site	D-1	D-2	D-3	D-4	D-5
	El Consejo (2Pipes)	Quebrada Pazo Real	Quebrada de Cua	Canal in Cua near Mercedes	Quebrada de Charallave
Date	27/3/96	28/02/96	26/02/96	22/3/96	28/02/96
Water Flow (l/s)	40.4	12	21		86
Odor	Cloacal	Cloacal	Cloacal	Cloacal	Cloacal
Color	Gris	Gris	S/C	Gris oscuro	Gris
Water Temperature (°C)	29	30	29.1	30	27.4
Air Temperature (°C)	38	32	29	35.5	31
pH	7.53	7.82	7.9	7.47	7.84
EC (mS/cm)	1.391	1.275	0.586	0.628	1.05
DO (mg/l)		1.3	5.2		1.9
Turbidity (NTU)	64	550	3.8	70.5	68.4
BOD (mg/l)	108	120	6	126	84
COD (mg/l)	200	180	37	224	165
S S (mg/l)	24	260	10	112	198
T-N (mg/l)	84	15	4	19	21
(without NO3+NO2)					
NH4-N (mg/l)	80.80	7.00	4.60	13.70	16.40
NO2-N + NO3 (mg/l)	<0.01	1.00	1.70	<0.01	0.09
T-P (mg/l)	5.05	5.70	1.54	4.30	2.98
D PO4-P (mg/l)	3.50	3.35	1.45	3.60	2.33
n-Hexane (mg/l)		1	9		13
TS (mg/l)		996	388		822
VS (mg/l)		320	288		302
VSS (mg/l)		252	48		158
Total Coli. (MPN/100ml)		3.00E+05	1.60E+05		8.00E+06
Fecal Coli. (MPN/100ml)		2.30E+05	1.60E+05		8.00E+06
Cl (mg/l)		180	57		112
TOC (mg/l)	112	120		62.8	64.2
Pb (ug/l)		<250	<250		<250
Cr (ug/l)		<50	<50		<50
Cu (ug/l)		80	<50		100
Zn (ug/l)		1,500	800		68
Ni (ug/l)		88	100		<50
Hg (ug/l)					
As (ug/l)					
Cd (ug/l)					
Se (ug/l)					
Note					

Table 1.2-8 (2/2) Results of Water Quality Analyses for Domestic Wastewater

Point Number Sampling Site	D-6	D-7	D-107	D-8	D-9
	La Avenida (Ocumare del Tuy)	Teraza de Cua after Treatment	Teraza de Cua before Treatment	Urb. La Mora (Cano Tiquirito)	El Mercado Ocumare
Date	26/3/96	1996/4/2	1996/4/2	27/3/96	27/02/96
Water Flow (l/s)	19.5	2	2	136	172
Odor	Cloacal	Cloacal	Cloacal	Cloacal	Cloacal
Color	Gris claro	Gris claro	Gris claro	Gris claro	Gris oscuro
Water Temperature (°C)	28	33	33	29	29.3
Air Temperature (°C)	34	39	39	30	30
pH	7.64	7.6	7.3	8.03	7.56
EC (mS/cm)	0.63			1.61	0.449
DO (mg/l)					0.7
Turbidity (NTU)	22.3	60	48	125.3	39.1
BOD (mg/l)	35	56	101	198	42
COD (mg/l)	75	119	60	410	56
S S (mg/l)	20	32	48	91	56
T-N (mg/l)	28	74	19	84	12
(without NO ₃ +NO ₂)					
NH ₄ -N (mg/l)	19.20	33	13	75.60	9.80
NO ₂ -N + NO ₃ (mg/l)	0.04	1.7	1.7	0.60	0.04
T-P (mg/l)	5.00	3.6	4.7	6.60	2.19
D PO ₄ -P (mg/l)	5.00	2.95	4.7	4.10	2.00
n-Hexane (mg/l)					3
TS (mg/l)					428
VS (mg/l)					100
VSS (mg/l)					48
Total Coli. (MPN/100ml)					5.00E+06
Fecal Coli. (MPN/100ml)					2.30E+06
Cl (mg/l)					26
TOC (mg/l)	29	41.3	79.3	136	57
Pb (ug/l)					<250
Cr (ug/l)					<50
Cu (ug/l)					100
Zn (ug/l)					55
Ni (ug/l)					<50
Hg (ug/l)					
As (ug/l)					
Cd (ug/l)					
Se (ug/l)					
Note					

Table 1.2-9(1/2) Number of Water Quality Analysis in the Previous Studies at Major Sampling Sites on the Tuy River

Site	Year, Month	Flow	BOD	COD	SS	DO	TN	TKN	TP
Las Caballerizas	1968-4	4	4	--	4	4	--	--	--
	1985-4	--	1	--	1	1	--	1	1
	1989-4	1	1	--	--	1	--	--	--
	1991-4	--	1	1	1	1	--	1	1
	1968-5, 6, 7, 8, 9	5	11	--	4	11	--	--	--
	1985-5, 6, 7, 8, 9	10	10	10	10	10	--	9	10
	1988-10	1	1	--	--	1	--	--	--
1990-6	--	1	1	1	1	--	1	1	
El Consejo (downstream)	1968-4	4	4	--	4	4	--	--	--
	1968-5, 6, 7, 8, 9	6	11	--	6	11	--	--	--
Las Tejerias	1989-4	1	1	--	--	1	--	--	--
	1991-4	--	1	1	1	1	1	--	1
	1994-2, 3, 4	--	--	19	15	--	--	--	--
	1990-6	--	1	1	1	1	--	1	1
	1994-5	--	--	4	4	--	--	--	--
Guayas	1968-4	--	4	--	5	4	--	--	--
	1985-4	--	1	1	1	1	--	1	1
	1989-4	--	1	--	--	1	--	--	--
	1993-12	--	--	1	--	--	1	--	1
	1968-5, 6, 1985-7, 8, 9	--	10	--	10	10	--	--	--
	1988-10	--	20	18	18	18	--	--	14
	1994-5	--	1	--	--	1	--	--	--
1994-5	--	--	2	2	--	--	--	--	
Boca de Cagua	1989-4	2	2	--	--	2	--	--	--
	1991-4	--	1	1	1	1	--	1	1
	1992-2, 4	13	13	13	13	13	3	--	--
	1994-4	--	--	4	4	--	--	--	--
	1988-10	2	2	--	--	--	--	--	--
	1990-6	--	--	1	1	1	--	1	1
	1990-8, 9, 10, 11	13	--	14	14	14	--	14	14
	1991-6	2	2	--	2	2	--	--	--
	1992-5	3	4	4	4	4	4	--	4
Los Gujies (upstream of Tacata)	1985-4	1	1	1	1	1	--	--	--
	1989-4	1	1	--	--	1	--	--	--
	1992-2	3	3	3	3	3	--	--	--
	1985-5, 6, 7, 8, 9	10	9	10	10	8	--	10	10
	1988-10	--	1	--	--	--	--	--	--
	1990-6	--	--	1	1	1	--	1	1
	1991-6	1	1	--	1	1	--	--	--
1992-5	4	5	5	5	5	5	--	5	

Table 1.2-9(2/2) Number of Water Quality Analysis in the Previous Studies at Major Sampling Sites on the Tuy River

Site	Year, Month	Flow	BOD	COD	SS	DO	TN	TKN	TP
Tazon	1968-4	4	4	-	-	3	-	-	-
	1989-4	1	1	-	-	1	-	-	-
	1991-4	-	1	1	1	1	-	1	1
	1994-3, 4	-	-	5	5	5	-	-	-
	1968-5	2	1	-	-	1	-	-	-
	1968-6#	-	2	-	2	2	-	-	-
	1988-10	-	1	-	-	1	-	-	-
	1990-6	-	1	1	1	1	-	1	1
1994-6	-	-	1	1	1	-	-	-	
Cua Bridge	1968-4	4	4	-	4	4	-	-	-
	1968-5	-	1	-	-	1	-	-	-
	1994-5, 6	-	-	5	8	5	-	-	-
Colonia Mendoza	1989-4	1	1	-	1	1	-	-	-
	1991-4	-	1	1	1	1	-	1	1
	1988-10	1	1	-	1	1	-	-	-
	1990-6	-	1	1	1	1	-	1	1
Ocumare Bridge	1968-4	-	8	-	8	8	-	-	-
	1985-4	2	2	2	2	2	-	2	1
	1989-4	2	2	-	-	2	-	-	-
	1991-4	-	1	1	1	1	-	1	1
	1992-2	-	3	3	3	3	-	3	3
	1994-3, 4	-	-	51	40	32	-	-	-
	1995-11, 12	-	4	7	7	7	-	-	-
	1996-1, 2, 3	-	14	18	14	15	-	-	-
	1968-5, 6	-	3	-	4	4	-	-	-
	1968-7, 8, 9	6	6	-	-	6	-	-	-
	1985-5, 6, 7, 8, 9	4	10	10	10	10	-	10	10
	1988-10	2	2	-	-	-	-	-	-
	1991-6	-	1	-	1	1	-	-	-
	1992-5	3	5	5	5	5	-	5	5
1994-5, 6	-	-	13	13	10	-	-	-	
S. A. Yare (Toma de Agua)	1968-3, 4	5	7	-	5	7	-	-	-
	1985-4	-	2	2	2	2	-	-	-
	1991-4	-	1	-	-	1	-	-	-
	1992-2, 4	23	23	23	23	23	23	-	23
	1993-12	-	-	1	-	-	-	-	-
	1994-2, 3, 4	-	-	22	21	-	-	-	15
	1968-5, 6, 7, 8, 9	9	15	-	11	-	-	-	15
	1985-5, 6, 7, 8, 9	-	20	20	20	11	-	16	14
	1988-10	1	1	-	1	1	-	-	-
	1990-8, 9, 10, 11	14	14	14	14	14	-	-	-
	1990-6	-	1	1	1	1	-	1	1
	1991-4, 6	2	3	-	3	3	-	-	-
	1992-5	5	5	5	5	5	5	-	4
1994-5, 6	-	-	22	15	9	-	-	-	

Table 1.2-10 Number of Water Quality Analysis in the Previous Studies at Major Sampling Sites on the Tributaries

Tributary	Year, Month	Flow	BOD	COD	SS	DO	TN	TKN	TP
Cano Tiquirito	1974 (dry season)	-	1	-	1	1	-	-	-
	1989-4	1	1	-	-	1	-	-	-
	1994-4	-	-	2	-	-	-	-	-
	1994-12	-	-	1	-	-	-	-	-
	1968-5, 6, 7, 8, 9	-	8	-	5	9	-	-	-
	1988-10	1	1	-	-	1	-	-	-
	1990-6	-	1	1	1	1	-	1	1
Qda. Morocopo	1974 (dry season)	-	1	-	1	1	-	-	-
	1989-4	1	1	-	-	1	-	-	-
	1994-4, 5	-	-	5	5	-	-	-	-
	1968-5, 6, 7, 8, 9	-	11	-	4	11	-	-	-
	1988-10	1	1	-	1	1	-	-	-
Qda. Guayas	1974 (dry season)	-	1	-	1	1	-	-	-
	1987-12	-	1	-	1	1	-	-	-
	1989-4	1	1	-	-	-	-	-	-
	1993-12	-	-	1	-	-	1	-	1
	1994-3	-	-	-	-	-	-	-	-
	1968-5, 6, 7, 8, 9	-	11	-	4	11	-	-	-
	1985-7	-	2	2	2	-	-	1	1
	1988-10	-	1	-	-	1	-	-	-
	1994-3	-	-	1	1	-	-	-	-
Cagua River	1989-4	1	1	-	1	1	-	-	-
	1988-10	1	1	-	1	1	-	-	-
Qda. Maitana	1989-4	1	-	-	-	-	-	-	-
	1994-4	-	-	2	3	-	-	-	-
	1988-10	1	1	-	-	-	-	-	-
Cano Aniagua.	1968-4	1	1	-	-	1	-	-	-
	1974 (dry season)	-	1	-	1	1	-	-	-
	1968-5, 6, 7, 8, 9	-	10	-	3	10	-	-	-
	1988-10	1	1	-	-	1	-	-	-
Tarma River	1989-4	1	1	-	-	1	-	-	-
	1968-7, 8, 9	-	4	3	4	-	-	-	-
	1988-10	1	1	-	-	1	-	-	-
Qda. Charallave	1974 (dry season)	-	1	-	1	1	-	-	-
	1989-4	1	1	-	-	1	-	-	-
	1994-4	-	-	23	25	13	-	-	-
	1968-5, 6, 7, 8	-	9	-	3	9	-	-	-
	1988-10	1	-	-	-	-	-	-	-
	1994-6	-	-	13	13	9	-	-	-
Sucuta River	1974 (dry season)	-	1	-	-	-	-	-	-
	1968-7, 8, 9	1	5	1	1	5	-	-	-
	1988-10	1	-	-	-	-	-	-	-
	1994-6	-	-	-	-	2	-	-	-

Table 1.2-11 Heavy Metals in the Tuy River Water obtained in the Previous Studies

Sampling Site	Year	T-Cd (ug/L)	T-Cr (ug/L)	T-Pb (ug/L)
Colonia Tovar	12-1987	20>	20>	20>
Las Caballerizas	05-1985	9, 11	-	-
Guayas	05-1985	8	57	-
	07-1985	-	140	-
	08-1985	-	100	-
	09-1985	-	100	-
Boca de Cagua	08-1990	20> (3 results)	20> (3 results)	50 > (3 results)
	09-1990	20> (4 results)	20> (4 results)	50> (4 results)
	10-1990	20> (5 results)	63, 94, 20> (3 results)	50> (5 results)
	02-1992	70-110 (7 results)	20> (7 results)	500-1800 (5 results)
Los Cujies	07-1985	-	96	-
	08-1985	-	100	-
	09-1985	-	100	-
	02-1992	60, 100, 100	68, 20>(2 results)	600, 800, 1800
Pinango	05-1985	9, 19	-	-
Cua	05-1985	9	-	-
Ocumare del Tuy	05-1985	15	-	-
	02-1992	110, 100	90, 20>	600, 4000
San Fco. de Yare	12-1987	20>	40	20>
S. A. de Yare	05-1985	9	-	-
	07-1985	-	117	-
	08-1985	10 (6 results)	133-203(7 results)	100> (5 results)
	09-1985	-	100-128(6 results)	100> (3 results)
	08-1990	20> (3 results)	50, 55, 187	50> (3 results)
	09-1990	20> (4 results)	566, 20> (3 results)	50> (4 results)
	10-1990	20> (5 results)	50, 220, 20>(3 results)	50> (5 results)
	11-1990	20> (2 results)	120, 220	50> (2 results)
	02-1992	60-90 (9 results)	20> (9 results)	400-1700 (9 results)

Table 1.3-1 Pollution Flowrate used Previously for Industrial Wastewater

CIU	Employee number	BOD factor (tons/year)	Pollution flowrate of BOD (kg/day/employee)
31111	177	261	6.10
31112	170	134	3.30
31113	514	86	0.70
31121	11	3	1.14
31221	34	10	1.20
31311	783	998	5.3 *1
31341	244	27	0.46
35211	432	112	1.10
35231	604	75	0.50
35232	160	12	0.3
35291	59	1	0.07
35292	1	0.26	1.10

Note: *1: An observed value of 90.2 by the water quality analysis un the present Study has been applied exceptionally for Ron Santa Teresa in the calculation.

Table 1.3-2 Pollution Flowrate for Industrial Wastewater

(1)

CIU	Pollution flowrate of BOD (kg/day/employee)
31173	0.08
31342	0.01
32111	1.28
35131	1.08
35135	1.08
35234	0.54
35295	0.42
36991	0.03
3699	0.03
37102	0.05
37201	0.05
38191	0.03
38193	0.03
38431	0.27
38433	0.27

(2)

CIU	Pollution flowrate of BOD (kg/day/employee)
32112	1.35
32113	1.21
32311	2.00
32321	2.00
36200	4.00
36201	4.00

Table 1.3-3 BOD Production and Effluent Load by Sub-basin and by Pollution Source (1995)

Production load

Basin	Industrial (kg/day)	Livestock (kg/day)	Domestic (kg/day)	Total (kg/day)	Ratio (%)
Upper	58,812	8,554	5,958	73,324	74.3
(%)	80.2	11.7	8.1	100.0	
Middle	7,859	3,758	13,799	25,417	25.7
(%)	30.9	14.8	54.3	100.0	
Total	66,672	12,312	19,756	98,740	100.0
(%)	67.5	12.5	20.0	100.0	

Effluent load

Basin	Industrial (kg/day)	Livestock (kg/day)	Domestic (kg/day)	Total (kg/day)	Ratio (%)
Upper	11,817	3,222	5,840	20,880	50.3
(%)	56.6	15.4	28.0	100.0	
Middle	5,046	1,878	13,670	20,594	49.7
(%)	24.5	9.1	66.4	100.0	
Total	16,864	5,100	19,510	41,474	100.0
(%)	40.7	12.3	47.0	100.0	

Table 1.3-4 Production and Effluent Load from Industries (BOD, 1990 and 1995)

Production Load (kg/day)

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	38	51,949	3,729	1,119	1	3	1,741	2,393	60,971
Non - Food Industry (kg/day)	0	0	1,354	54	569	71	2,831	820	5,700
Total (kg/day)	38	51,949	5,083	1,173	570	74	4,572	3,213	66,672
Population Equivalent (person)	700	962,011	94,129	21,717	10,558	1,377	84,665	59,504	1,234,661

Effluent Load (kg/day)

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	19	7,792	1,864	559	0	2	870	1,197	12,304
Non - Food Industry (kg/day)	0	0	1,083	43	456	57	2,265	658	4,560
Total (kg/day)	19	7,792	2,948	603	456	59	3,135	1,853	16,864
Population Equivalent (person)	350	144,302	54,589	11,158	8,443	1,084	58,062	34,308	312,295
Average of Pollution Removal Rate (%)	50	85	42	49	20	21	31	42	75

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.

Removal Rate in El Consejo is 85% by observation

: Removal Rate of Non-Food Industries is 20%.

Table 1.3-5 Production and Effluent Load from Piggeries (BOD, 1995)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,786			1,786		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution flowrate : 162(g/day/pig)
Population equivalent rate : 54(g/day/person)

Table 1.3-6(1/2) Production and Effluent Load from Domestic Wastewater (BOD, 1990)

Area No.	Name	Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	399	21.5		21.5	
	Tovar	3,373	182.1		91.1	
	Jarillo	517	27.9	231.6	27.9	140.5
2	La Mora	11,599	626.3		626.3	
	El Consejo	12,196	658.6	1,284.9	658.6	1,284.9
3	Sabaneta-Los Cerritos	13,527	730.5		730.5	
	La Guruta-La Concepcion	2,670	144.2		144.2	
	Morocopo	608	32.8		32.8	
	Las Tejerias	20,246	1,093.3	2,000.8	1,093.3	2,000.8
4	Curlepe	2,490	134.5		134.5	
	La Esperanza	455	24.6		24.6	
	Boqueron(La Penita)	968	52.3		52.3	
	Lagunetica	258	13.9	225.2	13.9	225.2
5	San Diego	817	44.1		44.1	
	Cortada de Maturin-Maitana	361	19.5		19.5	
	Agua Fria	769	41.5		41.5	
	San jose de Los Altas	786	42.4		42.4	
	Los Amarillos	779	42.1		42.1	
	Paracotos	6,038	326.1		326.1	
	Palo Negro	498	26.9		26.9	
	Carrizal	15,212	821.4	1,364.0	821.4	1,364.0
6	Tacata	1,198	64.7		64.7	
	San Daniel	299	16.1	80.8	16.1	80.8
7	Sabaneta	633	34.2	34.2	20.5	20.5
8	Aniagua	521	28.1		28.1	
	Los Chaguaramos	967	52.2		52.2	
	La Providencia	477	25.8		25.8	
	Qubrada Honda	550	29.7		29.7	
	La Palmita	128	6.9		6.9	
	Cua	10,104	545.6	688.3	545.6	688.3
9	Cua	40,416	2,182.5		2,182.5	
	Las Mercedes de Cua	5,969	322.3		322.3	
	La Siempre Viva	1,822	98.4		98.4	
	Parques del Sur	200	10.8		10.8	
	Colonia Mendoza	1,538	83.1		83.1	
	Piloncito(La Cabrera)	4,075	220.1		220.1	
	Santa Barbara	1,691	91.3		91.3	
	Charallave	51,807	2,797.6	5,806.0	2,741.6	5,750.0
10	Ocumare del Tuy	61,043	3,296.3		3,296.3	
	Los Cajones	769	41.5		41.5	
	Las Yaguas	251	13.6		13.6	
	Sucuta	1,845	99.6		99.6	
	San Francisco de Yare	9,905	534.9		508.1	
	Parcelamiento de Yare	1,021	55.1		55.1	
	Pinango	169	9.1	4,050.2	9.1	4,023.4
Total		291,963	-	15,766.0	-	15,578.6

Table 1.3-6(2/2) Production and Effluent Load of Domestic Wastewater (BOD, 1995)

Area No.	Name	Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	458	24.8		24.8	
	Tovar	4,354	235.1		117.6	
	Jarillo	469	25.3	285.2	25.3	167.7
2	La Mora	13,436	725.6		725.6	
	El Consejo	14,014	756.8	1,482.3	756.8	1,482.3
3	Sabaneta-Los Cerritos	15,544	839.4		839.4	
	La Guruta-La Concepcion	3,068	165.7		165.7	
	Morocopo	699	37.7		37.7	
	Las Tejerías	22,576	1,219.1	2,261.9	1,219.1	2,261.9
4	Curiepe	2,777	149.9		149.9	
	La Esperanza	507	27.4		27.4	
	Boqueron(La Penita)	1,138	61.4		61.4	
	Lagunetica	414	22.4	261.1	22.4	261.1
5	San Diego	960	51.9		51.9	
	Cortada de Maturin-Maitana	424	22.9		22.9	
	Agua Fria	904	48.8		48.8	
	San José de Los Altos	923	49.9		49.9	
	Los Amarillos	1,250	67.5		67.5	
	Paracotos	6,882	371.6		371.6	
	Palo Negro	568	30.6		30.6	
Carrizal	17,180	927.7	1,570.9	927.7	1,570.9	
6	Tacata	1,427	77.0		77.0	
	San Daniel	356	19.2	96.3	19.2	96.3
7	Sabaneta	754	40.7	40.7	24.4	24.4
8	Aniagua	662	35.7		35.7	
	Los Chaguaramos	1,228	66.3		66.3	
	La Providencia	606	32.7		32.7	
	Qubrada Honda	699	37.7		37.7	
	La Palmita	163	8.8		8.8	
	Cua	12,835	693.1	874.4	693.1	874.4
9	Cua	51,340	2,772.4		2,772.4	
	Las Mercedes de Cua	7,582	409.5		409.5	
	La Siempre Viva	2,314	125.0		125.0	
	Parques del Sur	228	12.3		12.3	
	Colonia Mendoza	1,955	105.6		105.6	
	Piloncito(La Cabrera)	5,180	279.7		279.7	
	Santa Barbara	2,149	116.1		116.1	
Charallave	72,437	3,911.6	7,732.0	3,833.3	7,653.8	
10	Ocumare del Tuy	77,592	4,190.0		4,190.0	
	Los Cajones	977	52.8		52.8	
	Las Yaguas	319	17.2		17.2	
	Sucuta	2,345	126.6		126.6	
	San Francisco de Yare	12,646	682.9		648.7	
	Parcelamiento de Yare	1,304	70.4		70.4	
	Pinango	216	11.7	5,151.5	11.7	5,117.4
Total		365,859	-	19,756.4	-	19,510.2

Table 1.4-1 Capable Analytical Parameters and Methods in the Laboratory

No	Parameter	Method
1	Oil and grease	Extraction by organic solvent
2	Aluminium	Atomic absorption spectrometry
3	Alkalinity	Volumetric method
4	Bromine (Br)	Disco Hellige
5	Calcium (Ca)	ISE method
6	Cyanide (CN)	ISE method
7	Chlorine (Cl)	Polarography
8	Residual Chlorine (Cl ₂)	Orthotridine
9	Copper (Cu)	Atomic absorption spectrometry
10	Conductivity	Potentiometer
11	Chromium (Cr)	Atomic absorption spectrometry
12	MBAS	Methylene Blue
13	BOD	Electric measuring method
14	COD	Potassium Dichromite titration
15	Total Hardness	EDTA titration
16	Calcium Hardness	EDTA titration
17	Phenol	Direct extraction by Chloroform
18	Total Phosphate	Ascorbic Acid
19	Fluorine (F)	ISE method
20	Specific Gravity	Gravimetric method
21	Iron (Fe)	Atomic absorption spectrometry
22	Langumuar Index	Electrometric method
23	Manganese (Mn)	Atomic absorption spectrometry
24	Nickel (Ni)	Atomic absorption spectrometry
25	Total Nitrogen	Kjeldahl method
26	Nitrate	Blucine spectrophotometric or ISE method
27	Nitrite	Colorimetric (NEDA)
28	Ammonium Nitrogen	Nester titration or ISE
29	pH	Potenciometric
30	Agro-chemicals	Gaschromatography
31	Silver (Ag)	ISE method
32	Lead (Pb)	Atomic absorption spectrometry
33	Potassium (K)	ISE method
34	Silicate (SiO ₂)	Molibden-silicate
35	Total Solid	Gravimetric method
36	Dissolved Solid	Gravimetric method
37	Total Suspended Solid	Gravimetric method
38	Sedimentable Solid	Volumetric method
39	Sodium (Na)	ISE method
40	Sulfate-ion	Gravimetric method
41	Sulfite-ion	ISE method
42	Turbidity	Turbidity meter
43	Zinc (Zn)	Atomic absorption spectrometry

Table 2.2-1 Regression Equation for Country's GDP and Industrial Gross Product

Group No.	Regression Equation	Data period	C. Coeff.	T value
1	$y = 119 + 0.2512 x$	1986 to 1994	0.9916	20.3303
2	$y = -2,366 + 0.01739 x$	1986 to 1994	0.9630	9.4533
3	$y = 1,281 + 0.006239 x$	1986 to 1992	0.8354	3.3983
4	$y = -459 + 0.002105 x$	1986 to 1992	0.9384	6.0716
5	$y = 416 + 0.003744 x$	1986 to 1994	0.7166	2.7183
6	$y = -3,154 + 0.01588 x$	1986 to 1994	0.7815	3.3144
7	$y = -321 + 0.01277 x$	1986 to 1992	0.8249	3.2625
8	$y = -247 + 0.001535 x$	1986 to 1993	0.9489	7.3672
9	$y = -2,501 + 0.007837 x$	1986 to 1994	0.9470	7.7988
10	$y = 1,165 + 0.003160 x$	1990 to 1994	0.8627	2.9551
11	$y = 6,082 + 0.002177 x$	1986 to 1992	0.2038	0.4655
12	$y = -1,289 + 0.01474 x$	1986 to 1994	0.7691	3.1833
13	$y = 1,446 + 0.007759 x$	1986 to 1994	0.8340	4.0000
14	$y = -440 + 0.004336 x$	1986 to 1994	0.7915	3.4265
15	$y = 1,957 + 0.0008306 x$	1986 to 1994	0.0411	0.1008

Note: C. Coeff.: Correlation coefficient

The variable "x" represents GDP of the country at 1984 prices and the variable "y" signifies industrial gross product of a group at 1984 prices.

Table 2.2-2 Industrial Growth Projection by Development Pattern

Pattern 1 (standard)

Group No.	2000	2005	2010
1	1.2501	1.6235	2.1901
2	1.3409	1.8493	2.621
3	1.1815	1.4522	1.8632
4	1.432	2.0763	3.0543
5	1.2084	1.5192	1.991
6	1.4062	2.0122	2.9319
7	1.2652	1.6608	2.2612
8	1.3641	1.9073	2.7318
9	1.6442	2.6051	4.0635
10	1.1483	1.3696	1.7054
11	1.0399	1.0995	1.1899
12	1.303	1.7549	2.4409
13	1.1863	1.4643	1.8862
14	1.313	1.78	2.4887
15	1.046	1.1146	1.2188
Average	1.2753	1.6859	2.3092

Values are rates based on 1990 (1990=1)

Pattern-2 (high)

Group No.	2000	2005	2010
1	1.2854	1.8809	2.9162
2	1.3785	2.1425	3.4901
3	1.2147	1.6825	2.4809
4	1.4722	2.4055	4.0669
5	1.2423	1.7601	2.6512
6	1.4457	2.3312	3.904
7	1.3007	1.9241	3.011
8	1.4024	2.2097	3.6375
9	1.6903	3.0181	5.4108
10	1.1806	1.5867	2.2708
11	1.0691	1.2738	1.5844
12	1.3396	2.0332	3.2502
13	1.2197	1.6964	2.5115
14	1.3499	2.0621	3.3138
15	1.0754	1.2913	1.6229
Average	1.3111	1.9532	3.0748

Values are rates based on 1990 (1990=1)

Pattern-3 (low)

Group No.	2000	2005	2010
1	1.1758	1.3612	1.576
2	1.2394	1.4919	1.7846
3	1.1275	1.2619	1.4178
4	1.3034	1.6234	1.9942
5	1.1464	1.3007	1.4796
6	1.2853	1.5863	1.935
7	1.1863	1.3827	1.6104
8	1.2558	1.5255	1.8381
9	1.4525	1.9297	2.4827
10	1.1042	1.2141	1.3414
11	1.0281	1.0576	1.0919
12	1.2128	1.4373	1.6974
13	1.1309	1.2689	1.4289
14	1.2199	1.4518	1.7203
15	1.0323	1.0664	1.1059
Average	1.1934	1.3973	1.6336

Values are rates based on 1990 (1990=1)

Table 2.2-3 Regression Equation for Year and Population by Parroquia

No	Parroquia	Regression Equation	Data period	C. Coeff.	T value
1	La Victoria	$y = -4,491,373 + 2,305.0870t$	1961-90	0.9778	6.5954
2	El Consejo	$y = -1,821,094 + 931.9746 t$	1961-90	0.9851	8.1069
3	Tovar	$\log y = -27.8933 + 0.01852 t$	1971-90	0.9884	6.5054
4	Las Tejerias	$y = -1,211,303 + 621.5881 t$	1961-90	0.9974	19.5252
5	Cecilio Acosta	$y = -478,580 + 245.7410 t$	1961-90	0.9420	3.9713
6	Tacata	$y = -122,552 + 64.4533 t$	1971-90	0.9998	53.9322
7	San Pedro	$\log y = -31.8302 + 0.02049 t$	1961-90	0.8796	2.6155
8	Los Teques	$y = -7,502,829 + 3,844.2130 t$	1961-90	0.9939	12.7677
9	Cua	$\log y = -102.5902 + 0.05713 t$	1961-90	0.9815	7.2541
10	Paracotos	$\log y = -41.8344 + 0.02553 t$	1961-90	0.9990	31.2589
11	Carrizal	$y = -1,797,788 + 918.3694 t$	1961-90	0.9975	19.8900
12	Ocumare del Tuy	$\log y = -77.8939 + 0.04482 t$	1961-90	0.9983	24.5698
13	S. F. de Yare	$\log y = -113.6985 + 0.06214 t$	1961-90	0.9803	7.0132
14	Charallave	$\log y = -123.3121 + 0.06746 t$	1961-90	0.9976	20.1672

Note: C.Coeff.: Correlation coefficient
where y = population and t = year.

Table 2.2-4 Population Projection in Parroquias

No	Parroquia	2000	2005	2010
1	La Victoria	118,801	130,326	141,852
2	El Consejo	42,855	47,515	52,175
3	Tovar	9,383	10,294	11,293
4	Las Tejerias	31,873	34,981	38,089
5	Cecilio Acosta	12,902	14,131	15,359
6	Tacata	6,355	6,677	6,999
7	San Pedro	9,413	10,428	11,553
8	Los Teques	85,597	204,818	224,039
9	Cua	116,985	155,663	207,130
10	Paracotos	10,154	11,536	13,107
11	Carrizal	38,951	43,543	48,134
12	Ocumare del Tuy	126,260	157,976	197,659
13	San Francisco de Yare	39,399	53,755	73,344
14	Charallave	109,963	154,076	215,885

Table 2.2-5 Parroquia and Town in the Study Area

No.	Parroquia/Town	No.	Parroquia/Town
01	La Victoria	09	Cua
011	La Mora	091	Cua
02	El Consejo	092	Aniagua
021	El Consejo	093	Los Chaguaramos
022	Sabaneta-Los Cerritos	094	La Providencia
023	La Gruta-La Concepcion	095	Las Mercedes de Cua
024	El Conde	096	La Siempre Viva
025	Morocopo	097	Quebrada Honda
03	Tovar	098	La Palmita
031	Tovar	10	Paracotos
04	Las Tejerias	101	Paracotos
041	Las Tejerias	102	Palo Negro
042	Curiepe	103	Parques de Sur
043	La Esperanza	11	Carrizal
05	Cecilio Acosta	111	Carrizal
051	Boqueron (La Penita)	12	Ocumare del Tuy
052	San Diego	121	Ocumare del Tuy
053	Cortada de Maturin-Maitana	122	Colonia Mendoza
054	Agua Fria	123	Pilonto (La Cabrera)
055	San Jose de Los Altos	124	Las Cajones
06	Tacata	125	Las Yaguas
061	Tacata	126	Sucuta
062	San Daniel	127	Santa Barbara
063	Sabaneta	13	San Francisco de Yare
07	San Pedro	131	San Francisco de Yare
071	Jarillo	132	Parcelamiento de Yare
08	Los Teques	133	Pinango
081	Lagunetica	14	Charallave
082	Los Amarillos	141	Charallave

Table 2.2-6 Projected Percentage of Population of Each Town

No.	2000	2005	2010	No.	2000	2005	2010
011	12.45	12.30	12.15	092	0.70	0.70	0.70
021	36.00	35.50	35.00	093	1.40	1.40	1.40
022	40.00	39.50	39.00	094	0.60	0.55	0.50
023	8.10	8.10	8.10	095	9.00	9.30	9.60
024	1.20	1.20	1.20	096	2.80	2.90	3.00
025	1.90	1.90	1.90	097	0.70	0.65	0.60
031	50.90	50.90	50.90	098	0.15	0.13	0.10
041	79.00	79.50	80.00	101	77.60	77.90	78.10
042	10.00	10.50	11.00	102	6.30	6.30	6.30
043	1.70	1.70	1.70	103	2.50	2.50	2.50
051	10.00	10.50	11.00	111	100.00	100.00	100.00
052	17.60	18.60	19.60	121	77.00	77.00	77.00
053	3.40	3.40	3.40	122	1.90	1.90	1.90
054	8.30	8.80	9.30	123	5.10	5.10	5.10
055	17.00	18.00	19.00	124	1.00	1.00	1.00
061	24.40	24.90	25.40	125	0.30	0.30	0.30
062	5.80	5.80	5.80	126	2.30	2.30	2.30
063	12.40	12.40	12.40	127	2.10	2.10	2.10
071	10.00	9.00	8.00	131	41.80	41.30	40.80
081	0.20	0.20	0.20	132	4.50	4.50	4.50
082	0.90	1.00	1.10	133	1.50	1.50	1.50
091	74.50	75.50	76.50	141	92.30	92.30	92.30

Table 2.2-7 Projection of Population in the Study Area by Development Pattern

Pattern 1 (standard)

No	Parroquia	1990	2000	2005	2010
1	La Victoria	11,599	14,791	16,030	17,235
2	El Consejo	29,400	37,370	40,938	44,453
3	Tovar	3,373	4,776	5,240	5,748
4	Las Tejerías	23,191	28,909	32,078	35,309
5	Cecilio Acosta	5,303	7,264	8,380	9,569
6	Tacata	2,130	2,707	2,878	3,052
7	San Pedro	1,034	941	939	924
8	Los Teques	1,037	2,042	2,458	2,913
9	Cua	60,954	105,111	141,856	191,388
10	Paracotos	6,736	8,773	10,002	11,350
11	Carrizal	30,423	38,951	43,543	48,134
12	Ocumare del Tuy	71,212	113,255	141,704	177,300
13	San Francisco de Yare	11,264	18,833	25,426	34,325
14	Charallave	51,807	101,496	142,212	199,262
	Aragua State (1-4)	67,563	85,845	94,305	102,745
	Miranda State (5-14)	241,900	399,373	519,397	678,256
	Total	309,463	485,218	613,702	781,001

Pattern 2 (high)

No	Parroquia	1990	2000	2005	2010
1	La Victoria	11,599	16,142	18,960	21,961
2	El Consejo	29,400	40,785	48,445	56,642
3	Tovar	3,373	5,212	6,197	7,324
4	Las Tejerías	23,191	31,551	37,941	44,990
5	Cecilio Acosta	5,303	7,489	8,899	10,459
6	Tacata	2,130	2,791	3,056	3,336
7	San Pedro	1,034	1,026	1,018	1,010
8	Los Teques	1,037	2,105	2,610	3,184
9	Cua	60,954	108,369	150,651	209,206
10	Paracotos	6,736	9,045	10,622	12,450
11	Carrizal	30,423	40,158	46,243	52,615
12	Ocumare del Tuy	71,212	116,766	150,490	193,807
13	San Francisco de Yare	11,264	19,417	27,003	37,521
14	Charallave	51,807	104,642	151,029	217,813
	Aragua State (1-4)	67,563	93,691	111,543	130,917
	Miranda State (5-14)	241,900	411,809	551,622	741,402
	Total	309,463	505,500	663,165	872,319

Pattern 3 (low)

No	Parroquia	1990	2000	2005	2010
1	La Victoria	11,599	12,227	12,855	13,483
2	El Consejo	29,400	31,192	32,984	34,776
3	Tovar	3,373	4,401	4,448	4,497
4	Las Tejerías	23,191	26,637	27,234	27,622
5	Cecilio Acosta	5,303	6,479	6,667	6,790
6	Tacata	2,130	2,142	2,153	2,165
7	San Pedro	1,034	840	747	656
8	Los Teques	1,037	1,821	1,955	2,067
9	Cua	60,954	93,749	112,860	135,809
10	Paracotos	6,736	7,825	7,957	8,082
11	Carrizal	30,423	31,667	32,912	34,156
12	Ocumare del Tuy	71,212	101,012	112,740	125,812
13	San Francisco de Yare	11,264	16,797	20,229	24,357
14	Charallave	51,807	90,524	113,144	141,396
	Aragua State (1-4)	67,563	74,457	77,521	80,378
	Miranda State (5-14)	241,900	352,854	411,365	481,290
	Total	309,463	427,311	488,866	561,668

Table 2.2-8 Projection of Population Growth in the Study Area by Development Pattern

Pattern 1 (standard)

No	Parroquia	2000	2005	2010
1	La Victoria	1.2752	1.3820	1.4859
2	El Consejo	1.2711	1.3931	1.5120
3	Tovar	1.4159	1.5534	1.7042
4	Las Tejerías	1.2466	1.3832	1.5225
5	Cecilio Acosta	1.3698	1.5802	1.8044
6	Tacata	1.2710	1.3511	1.4327
7	San Pedro	0.9103	0.9077	0.8938
8	Los Teques	1.9687	2.3701	2.8086
9	Cua	1.7244	2.3273	3.1399
10	Paracotos	1.3024	1.4848	1.6909
11	Carrizal	1.2803	1.4313	1.5822
12	Ocumare del Tuy	1.5904	1.9899	2.4898
13	San Francisco de Yare	1.6719	2.2573	3.0473
14	Charallave	1.9591	2.7450	3.8462
	Aragua State (1-4)	1.2706	1.3958	1.5207
	Miranda State (5-14)	1.6510	2.1472	2.8039
	Total	1.5679	1.9831	2.5237

Values are rates based on 1990 (1990=1)

Pattern-2 (high)

No	Parroquia	2000	2005	2010
1	La Victoria	1.3917	1.6347	1.8933
2	El Consejo	1.3872	1.6478	1.9266
3	Tovar	1.5454	1.8374	2.1714
4	Las Tejerías	1.3605	1.6360	1.9400
5	Cecilio Acosta	1.4122	1.6781	1.9724
6	Tacata	1.3104	1.4348	1.5660
7	San Pedro	0.9923	0.9845	0.9771
8	Los Teques	2.0298	2.5171	3.0701
9	Cua	1.7779	2.4715	3.4322
10	Paracotos	1.3428	1.5769	1.8483
11	Carrizal	1.3200	1.5200	1.7295
12	Ocumare del Tuy	1.6397	2.1133	2.7215
13	San Francisco de Yare	1.7238	2.3972	3.3310
14	Charallave	2.0198	2.9152	4.2043
	Aragua State (1-4)	1.3867	1.6509	1.9377
	Miranda State (5-14)	1.7024	2.2284	3.0649
	Total	1.6335	2.1429	2.8188

Values are rates based on 1990 (1990=1)

Pattern-3 (low)

No	Parroquia	2000	2005	2010
1	La Victoria	1.054	1.108	1.162
2	El Consejo	1.061	1.122	1.183
3	Tovar	1.305	1.319	1.333
4	Las Tejerías	1.149	1.174	1.191
5	Cecilio Acosta	1.222	1.257	1.280
6	Tacata	1.006	1.011	1.017
7	San Pedro	0.858	0.738	0.634
8	Los Teques	1.756	1.886	1.993
9	Cua	1.538	1.852	2.228
10	Paracotos	1.162	1.181	1.200
11	Carrizal	1.041	1.082	1.123
12	Ocumare del Tuy	1.419	1.583	1.767
13	San Francisco de Yare	1.491	1.796	2.162
14	Charallave	1.747	2.184	2.729
	Aragua State (1-4)	1.102	1.147	1.190
	Miranda State (5-14)	1.459	1.701	1.990
	Total	1.381	1.580	1.815

Values are rates based on 1990 (1990=1)

Table 2.3-1 Baseline Pollution Projection for BOD

Effluent Load (BOD: kg/day)

		1990	1995	Standard			High			Low		
				2000	2005	2010	2000	2005	2010	2000	2005	2010
	Tovar	159	187	210	239	277	228	282	358	191	197	205
R-2	El consejo	9,077	9,275	27,113	53,636	93,814	29,216	69,184	139,453	21,571	34,744	50,003
R-4	Las Tejerias	7,234	7,496	9,028	11,196	14,351	9,437	13,014	18,885	8,350	9,381	10,552
R-5	Q. Guayas	1,764	1,800	2,138	2,627	3,350	2,201	2,979	4,294	2,022	2,253	2,518
X-4	Q. Maitana	1,820	2,027	2,536	3,195	4,085	2,615	3,523	4,933	2,174	2,435	2,727
	Upstream	20,055	20,784	41,026	70,892	115,876	43,697	88,982	167,922	34,309	49,011	66,005
R-6	Q. Guare	1,235	1,255	1,263	1,271	1,279	1,267	1,279	1,293	1,236	1,236	1,237
R-8	Cua	761	947	1,281	1,727	2,333	1,320	1,846	2,592	1,146	1,378	1,655
R-9	Charallave	9,614	11,518	15,586	21,291	29,389	16,075	23,390	34,666	14,088	17,071	20,667
R-10	Ocumare	5,876	6,970	9,352	12,639	17,203	9,672	14,071	20,893	8,342	9,866	11,614
	Middle	17,487	20,690	27,483	36,928	50,204	28,334	40,586	59,443	24,812	29,551	35,173
	Total	37,542	41,474	68,508	107,820	166,080	72,031	129,568	227,365	59,121	78,562	101,178

Water Quality (BOD: mg/l)

		1990	1995	Standard			High			Low		
				2000	2005	2010	2000	2005	2010	2000	2005	2010
R-2	El Consejo	-	686	1,843	3,345	5,335	1,874	3,815	6,523	1,641	2,525	3,468
R-4	Las Tejerias	-	563	1,091	1,731	2,518	1,090	1,885	2,886	1,012	1,406	1,814
R-5	Q. Guayas	-	598	1,101	1,706	2,440	1,097	1,845	2,776	1,031	1,406	1,794
X-4	Q. Maitana	-	34	61	95	138	62	107	165	57	78	100
R-6	R. Guare	-	32	48	69	97	49	77	119	45	57	70
R-8	Cua	-	30	42	57	76	42	62	90	39	48	58
R-9	Charallave	-	8	11	15	19	11	16	22	10	12	14
R-10	Ocumare	-	7	9	12	14	9	12	16	9	10	11

Table 2.3-2(1/9) Production and Effluent Load Projection from Industries (BOD) (Standard : 2000)

Production									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	47	69,634	4,711	1,399	1	4	2,176	3,204	81,176
Non - Food Industry (kg/day)	0	0	1,650	76	853	91	3,616	1,063	7,350
Total (kg/day)	47	69,634	6,361	1,475	854	95	5,793	4,268	88,526
Population Equivalent (person)	875	1,289,517	117,804	27,306	15,807	1,761	107,272	79,029	1,639,370

Effluent									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	28	25,478	2,847	839	1	2	1,306	2,008	32,508
Non - Food Industry (kg/day)	0	0	1,380	65	739	77	3,050	899	6,210
Total (kg/day)	28	25,478	4,226	904	739	79	4,356	2,907	38,718
Population Equivalent (person)	525	471,808	78,264	16,748	13,691	1,468	80,668	53,833	717,004
Average of Treatment (%)	40	63	34	39	13	17	25	32	56

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(2/9) Production and Effluent Load Projection from Industries (BOD) (Standard : 2005)

Production									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	61	96,009	6,177	1,816	1	5	2,826	4,414	111,309
Non - Food Industry (kg/day)	0	0	2,092	109	1,275	121	4,788	1,426	9,811
Total (kg/day)	61	96,009	8,269	1,925	1,276	126	7,614	5,840	121,120
Population Equivalent (person)	1,136	1,777,943	153,122	35,646	23,635	2,334	140,996	108,149	2,242,961

Effluent									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	42	51,853	4,312	1,257	1	4	1,956	3,217	62,642
Non - Food Industry (kg/day)	0	0	1,821	98	1,161	107	4,222	1,262	8,671
Total (kg/day)	42	51,853	6,133	1,355	1,162	110	6,177	4,479	71,312
Population Equivalent (person)	786	960,234	113,582	25,087	21,520	2,041	114,392	82,953	1,320,595
Average of Treatment (%)	31	46	26	30	9	13	19	23	41

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(3/9) A103 Production and Effluent Load Projection from Industries(BOD) (Standard : 2010)

Production									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	83	136,044	8,401	2,450	2	7	3,812	6,250	157,048
Non - Food Industry (kg/day)	0	0	2,762	158	1,916	166	6,566	1,977	13,546
Total (kg/day)	83	136,044	11,164	2,608	1,918	173	10,378	8,227	170,594
Population Equivalent (person)	1,533	2,519,325	206,732	48,303	35,517	3,204	192,183	152,350	3,159,147

Effluent									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	64	91,887	6,537	1,891	1	5	2,942	5,053	108,381
Non - Food Industry (kg/day)	0	0	2,491	148	1,802	152	5,999	1,813	12,406
Total (kg/day)	64	91,887	9,028	2,038	1,804	157	8,941	6,866	120,786
Population Equivalent (person)	1,183	1,701,615	167,191	37,745	33,402	2,911	165,580	127,155	2,236,781
Average of Treatment (%)	23	32	19	22	6	9	14	17	29

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(4/9) A136 Production and Effluent Load Projection from Industries (BOD) (High : 2000)

Production									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	49	71,587	4,844	1,438	1	4	2,237	3,294	83,453
Non - Food Industry (kg/day)	0	0	1,697	78	877	94	3,718	1,093	7,556
Total (kg/day)	49	71,587	6,540	1,516	878	98	5,955	4,387	91,010
Population Equivalent (person)	900	1,325,677	121,117	28,075	16,250	1,810	110,287	81,246	1,685,362

Effluent									
Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	30	27,430	2,979	879	1	3	1,367	2,097	34,786
Non - Food Industry (kg/day)	0	0	1,426	67	763	79	3,152	929	6,416
Total (kg/day)	30	27,430	4,405	946	763	82	4,519	3,027	41,202
Population Equivalent (person)	550	507,968	81,577	17,517	14,135	1,517	83,684	56,050	762,996
Average of Treatment (%)	39	62	33	38	13	16	24	31	55

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(5/9) Production and Effluent Load Projection from Industries(BOD) (High : 2005)
Production

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	71	111,231	7,156	2,104	1	6	3,274	5,113	128,957
Non - Food Industry (kg/day)	0	0	2,424	126	1,477	140	5,547	1,653	11,366
Total (kg/day)	71	111,231	9,580	2,230	1,479	146	8,821	6,766	140,323
Population Equivalent (person)	1,317	2,059,830	177,400	41,297	27,382	2,704	163,351	125,296	2,598,577

Effluent

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	52	67,075	5,292	1,545	1	4	2,404	3,917	80,289
Non - Food Industry (kg/day)	0	0	2,153	115	1,363	126	4,981	1,488	10,226
Total (kg/day)	52	67,075	7,444	1,660	1,364	130	7,384	5,405	90,515
Population Equivalent (person)	967	1,242,120	137,860	30,739	25,267	2,411	136,747	100,100	1,676,211
Average of Treatment (%)	27	40	22	26	8	11	16	20	35

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
Removal Rate in El Consejo is 85% by observation
: Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(6/9) Production and Effluent Load Projection from Industries (BOD) (High : 2010)
Production

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	110	181,154	11,187	3,262	2	9	5,076	8,322	209,123
Non - Food Industry (kg/day)	0	0	3,678	211	2,551	221	8,743	2,633	18,037
Total (kg/day)	110	181,154	14,865	3,473	2,554	230	13,819	10,955	227,160
Population Equivalent (person)	2,041	3,354,709	275,272	64,318	47,293	4,266	255,902	202,867	4,206,669

Effluent

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	91	136,998	9,322	2,703	2	8	4,206	7,125	160,456
Non - Food Industry (kg/day)	0	0	3,407	200	2,438	207	8,176	2,469	16,897
Total (kg/day)	91	136,998	12,730	2,903	2,440	215	12,382	9,594	177,352
Population Equivalent (person)	1,691	2,537,000	235,732	53,760	45,178	3,973	229,298	177,671	3,284,303
Average of Treatment (%)	17	24	14	16	4	7	10	12	22

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
Removal Rate in El Consejo is 85% by observation
: Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(7/9) Production and Effluent Load Projection from Industries (BOD) (Low : 2000)

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	44	64,368	4,419	1,315	1	4	2,047	2,963	75,161
Non - Food Industry (kg/day)	0	0	1,562	69	768	85	3,383	991	6,859
Total (kg/day)	44	64,368	5,981	1,385	769	89	5,429	3,954	82,020
Population Equivalent (person)	823	1,192,006	110,762	25,644	14,245	1,647	100,546	73,216	1,518,888

Effluent

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	26	20,212	2,555	756	1	2	1,176	1,766	26,493
Non - Food Industry (kg/day)	0	0	1,291	59	654	71	2,817	827	5,719
Total (kg/day)	26	20,212	3,846	815	655	73	3,993	2,593	32,212
Population Equivalent (person)	473	374,296	71,221	15,086	12,129	1,353	73,943	48,020	596,522
Average of Treatment (%)	43	69	36	41	15	18	26	34	61

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(8/9) Production and Effluent Load Projection from Industries (BOD) (Low : 2005)

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	51	77,468	5,147	1,523	1	4	2,369	3,563	90,127
Non - Food Industry (kg/day)	0	0	1,782	86	978	100	3,964	1,171	8,081
Total (kg/day)	51	77,468	6,928	1,608	979	104	6,334	4,735	98,208
Population Equivalent (person)	953	1,434,585	128,302	29,786	18,132	1,931	117,294	87,678	1,818,662

Effluent

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	33	33,311	3,282	963	1	3	1,499	2,367	41,459
Non - Food Industry (kg/day)	0	0	1,511	75	864	86	3,398	1,007	6,941
Total (kg/day)	33	33,311	4,793	1,038	865	88	4,897	3,374	48,400
Population Equivalent (person)	603	616,876	88,761	19,227	16,017	1,638	90,691	62,482	896,296
Average of Treatment (%)	37	57	31	35	12	15	23	29	51

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-2(9/9) Production and Effluent Load Projection from Industries (BOD) (Low : 2010)
Production

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	60	92,652	5,990	1,763	1	5	2,743	4,260	107,475
Non - Food Industry (kg/day)	0	0	2,036	104	1,221	117	4,639	1,380	9,497
Total (kg/day)	60	92,652	8,026	1,868	1,222	122	7,382	5,640	116,972
Population Equivalent (person)	1,103	1,715,785	148,628	34,584	22,638	2,261	136,702	104,442	2,166,145

Effluent

Category	Tovar	El Consejo	Las Tejerias	Qda Guayas	Pracotos	Cua	Carallave	Ocumare del Tuy	Total
Food Industry (kg/day)	41	48,496	4,126	1,204	1	3	1,873	3,063	58,807
Non - Food Industry (kg/day)	0	0	1,765	94	1,107	103	4,072	1,216	8,357
Total (kg/day)	41	48,496	5,891	1,297	1,108	106	5,945	4,279	67,164
Population Equivalent (person)	753	898,076	109,088	24,026	20,522	1,968	110,099	79,247	1,243,779
Average of Treatment (%)	32	48	27	31	9	13	19	24	43

Note : Removal Rate of Food Industries is 50%, excepting Factory in El Consejo.
 Removal Rate in El Consejo is 85% by observation
 : Removal Rate of Non-Food Industries is 20%.

Table 2.3-3(1/9) Production and Effluent Load Projection from Piggeries (BOD) (Standard : 2000)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(2/9) Production and Effluent Load Projection from Piggeries (BOD) (Standard : 2005)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(3/9) Production and Effluent Load Projection from Piggeries (BOD) (Standard : 2010)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(4/9) Production and Effluent Load Projection from Piggeries (BOD) (High : 2000)+A135

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(5/9) Production and Effluent Load Projection from Piggeries (BOD) (High : 2005)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare del Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(6/9) Production and Effluent Load Projection form Piggeries (BOD) (High : 2010)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare del Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(7/9) Production and Effluent Load Projection from Piggeries (BOD) (Low : 2000)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(8/9) Production and Effluent Load Projection from Piggeries (BOD) (Low : 2005)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare de Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-3(9/9) Production and Effluent Load Projection from Piggeries (BOD) (Low : 2010)

Area	Category	Numbers	Production (kg/day)	total (kg/day)	P.E (person)	Effluent (kg/day)	total (kg/day)	P.E (person)
Morocopo, Las Tejerias	Good treatment	10,700	1,733	6,140	113,700	520	2,286	42,330
	Bad treatment	10,900	1,766			1,766		
	No discharge	16,300	2,641			0		
Q.Guayas	Good treatment	4,300	697	1,426	26,400	209	209	3,870
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
B.Cagua	Good treatment	2,300	373	988	18,300	112	727	13,470
	Bad treatment	3,800	616			616		
	No discharge	0	0			0		
Tacata	Good treatment	0	0	1,134	21,000	0	1,134	21,000
	Bad treatment	7,000	1,134			1,134		
	No discharge	0	0			0		
R.Tarma	Good treatment	300	49	49	900	15	15	270
	Bad treatment	0	0			0		
	No discharge	0	0			0		
Q.Charallave	Good treatment	0	0	729	13,500	0	0	0
	Bad treatment	0	0			0		
	No discharge	4,500	729			0		
Q.Mume	Good treatment	0	0	729	13,500	0	729	13,500
	Bad treatment	4,500	729			729		
	No discharge	0	0			0		
Ocumare del Tyu, S.F de Yare	Good treatment	0	0	1,118	20,700	0	0	0
	Bad treatment	0	0			0		
	No discharge	6,900	1,118			0		
Total		76,000	12,312	12,312	228,000	5,100	5,100	94,440

Note : Pollution rate : 162(g/day/pig)
Pollution equivalent rate : 54(g/day/person)

Table 2.3-4(1/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (Standard : 2000)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	507	27.4	310.7	27.4	181.7
	Tovar	4,776	257.9		128.9	
	Jarillo	471	25.4		25.4	
2	La Mora	14,791	798.7	1,635.8	798.7	1,635.8
	El Consejo	15,502	837.1		837.1	
3	Sabaneta-Los Cerritos	17,194	928.5	2,516.4	928.5	2,516.4
	La Guruta-La Concepcion	3,394	183.3		183.3	
	Morocopo	773	41.7		41.7	
	Las Tejerias	25,239	1,362.9		1,362.9	
4	Curipe	3,104	167.6	297.3	167.6	297.3
	La Esperanza	567	30.6		30.6	
	Boqueron(La Penita)	1,326	71.6		71.6	
	Lagunetica	508	27.4		27.4	
5	San Diego	1,119	60.4	1,796.3	60.4	1,796.3
	Cortada de Maturin-Maitana	494	26.7		26.7	
	Agua Fria	1,053	56.9		56.9	
	San Jose de Los Altas	1,076	58.1		58.1	
	Los Amarillos	1,534	82.8		82.8	
	Paracotos	7,864	424.7		424.7	
	Palo Negro	649	35.0		35.0	
	Carrizal	19,475	1,051.7		1,051.7	
6	Tacata	1,523	82.2	102.7	82.2	102.7
	San Daniel	380	20.5		20.5	
7	Sabaneta	805	43.4	43.4	26.1	26.1
8	Anlagua	898	48.5	1,187.0	48.5	1,187.0
	Los Chaguaramos	1,667	90.0		90.0	
	La Providencia	823	44.4		44.4	
	Qubrada Honda	948	51.2		51.2	
	La Palmita	221	11.9		11.9	
	Cua	17,423	940.9		940.9	
9	Cua	69,693	3,763.4	10,611.0	3,763.4	10,501.4
	Las Mercedes de Cua	10,293	555.8		555.8	
	La Siempre Viva	3,142	169.7		169.7	
	Parques del Sur	260	14.1		14.1	
	Colonia Mendoza	2,446	132.1		132.1	
	Piloncito(La Cabrera)	6,481	350.0		350.0	
	Santa Barbara	2,689	145.2		145.2	
	Charallave	101,495	5,480.7		5,371.1	
10	Ocumare del Tuy	97,083	5,242.5	6,490.2	5,242.5	6,445.5
	Los Cajones	1,223	66.0		66.0	
	Las Yaguas	399	21.6		21.6	
	Sucuta	2,934	158.5		158.5	
	San Francisco de Yare	16,560	894.2		849.5	
	Parcelamiento de Yare	1,707	92.2		92.2	
	Pinango	283	15.3		15.3	
Total		462,793	-	24,990.8	-	24,690.2

Table 2.3-4(2/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (Standard : 2005)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	556	30.0	338.3	30.0	196.8
	Tovar	5,240	282.9		141.5	
	Jarillo	469	25.3		25.3	
2	La Mora	16,030	865.6	1,783.1	865.6	1,783.1
	El Consejo	16,990	917.5		917.5	
3	Sabaneta-Los Cerritos	18,844	1,017.6	2,776.4	1,017.6	2,776.4
	La Guruta-La Concepcion	3,720	200.9		200.9	
	Morocopo	847	45.7		45.7	
	Las Tejerias	28,004	1,512.2		1,512.2	
4	Curlepe	3,444	186.0	335.6	186.0	335.6
	La Esperanza	629	34.0		34.0	
	Boqueron(La Penita)	1,530	82.6		82.6	
	Lagunetica	611	33.0		33.0	
5	San Diego	1,291	69.7	2,032.6	69.7	2,032.6
	Cortada de Maturin-Maitana	570	30.8		30.8	
	Agua Fria	1,215	65.6		65.6	
	San Jose de Los Altas	1,241	67.0		67.0	
	Los Amarillos	1,846	99.7		99.7	
	Paracotos	8,965	484.1		484.1	
	Palo Negro	739	39.9		39.9	
	Carrizal	21,772	1,175.7		1,175.7	
6	Tacata	1,619	87.4	109.2	87.4	109.2
7	San Daniel	404	21.8	46.2	21.8	46.2
8	Sabaneta	855	46.2	1,602.0	27.7	27.7
	Aniagua	1,213	65.5		65.5	
	Los Chaguaramos	2,250	121.5		121.5	
	La Providencia	1,110	59.9		59.9	
	Qubrada Honda	1,280	69.1		69.1	
	La Palmita	298	16.1		16.1	
9	Cua	23,515	1,269.8	14,538.6	1,269.8	14,385.0
	Cua	94,060	5,079.2		5,079.2	
	Las Mercedes de Cua	13,892	750.1		750.1	
	La Siempre Viva	4,240	229.0		229.0	
	Parques del Sur	297	16.0		16.0	
	Colonia Mendoza	3,060	165.3		165.3	
	Piloncito(La Cabrera)	8,109	437.9		437.9	
	Santa Barbara	3,365	181.7		181.7	
10	Charallave	142,210	7,679.4	8,219.6	7,525.8	8,159.3
	Ocumare del Tuy	121,469	6,559.4		6,559.4	
	Los Cajones	1,530	82.6		82.6	
	Las Yaguas	499	27.0		27.0	
	Sucuta	3,671	198.3		198.3	
	San Francisco de Yare	22,359	1,207.4		1,147.0	
	Parcelamiento de Yare	2,305	124.5		124.5	
Pinango	381	20.6	20.6			
Total		588,548	-	31,781.6	-	31,407.7

Table 2.3-4(3/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (Standard : 2010)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	603	32.6	367.9	32.6	212.7
	Tovar	5,748	310.4		155.2	
	Jarillo	462	25.0		25.0	
2	La Mora	17,235	930.7	1,926.5	930.7	1,926.5
	El Consejo	18,440	995.8		995.8	
3	Sabaneta-Los Cerritos	20,453	1,104.5	3,036.6	1,104.5	3,036.6
	La Guruta-La Concepcion	4,037	218.0		218.0	
	Morocopo	919	49.6		49.6	
	Las Tejerías	30,825	1,664.5		1,664.5	
4	Curiepe	3,791	204.7	375.6	204.7	375.6
	La Esperanza	693	37.4		37.4	
	Boqueron(La Penita)	1,747	94.3		94.3	
	Lagunetica	725	39.1		39.1	
5	San Diego	1,474	79.6	2,280.8	79.6	2,280.8
	Cortada de Maturin-Maitana	651	35.2		35.2	
	Agua Fria	1,388	74.9		74.9	
	San jose de Los Altas	1,417	76.5		76.5	
	Los Amarillos	2,188	118.1		118.1	
	Paracotos	10,210	551.3		551.3	
	Palo Negro	842	45.5		45.5	
Carrizal	24,068	1,299.7	1,299.7			
6	Tacata	1,716	92.7	115.8	92.7	115.8
	San Daniel	428	23.1		23.1	
7	Sabaneta	907	49.0	49.0	29.4	29.4
8	Aniagua	1,636	88.3	2,161.3	88.3	2,161.3
	Los Chaguaramos	3,036	164.0		164.0	
	La Providencia	1,498	80.9		80.9	
	Qubrada Honda	1,727	93.3		93.3	
	La Palmita	402	21.7		21.7	
	Cua	31,726	1,713.2		1,713.2	
9	Cua	126,902	6,852.7	19,934.0	6,852.7	19,718.8
	Las Mercedes de Cua	18,742	1,012.1		1,012.1	
	La Siempre Viva	5,721	308.9		308.9	
	Parques del Sur	338	18.3		18.3	
	Colonia Mendoza	3,829	206.8		206.8	
	Piloncito(La Cabrera)	10,146	547.9		547.9	
	Santa Barbara	4,210	227.4		227.4	
	Charallave	199,260	10,760.0		10,544.8	
10	Ocumare del Tuy	151,985	8,207.2	10,418.1	8,207.2	10,336.6
	Los Cajones	1,915	103.4		103.4	
	Las Yaguas	625	33.7		33.7	
	Sucuta	4,594	248.1		248.1	
	San Francisco de Yare	30,184	1,629.9		1,548.4	
	Parcelamiento de Yare	3,111	168.0		168.0	
	Pinango	515	27.8		27.8	
Total		753,068		40,665.7		40,194.2

**Table 2.3-4(4/9) Production and Effluent Load Projection from
Domestic Wastewater (BOD) (Standard : 2000)**

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	553	29.9	339.1	29.9	198.3
	Tovar	5,213	281.5		140.7	
	Jarillo	513	27.7		27.7	
2	La Mora	16,142	871.7	1,785.3	871.7	1,785.3
	El Consejo	16,918	913.6		913.6	
3	Sabaneta-Los Cerritos	18,765	1,013.3	2,746.3	1,013.3	2,746.3
	La Guruta-La Concepción	3,704	200.0		200.0	
	Morocopo	843	45.5		45.5	
	Las Tejerías	27,545	1,487.4		1,487.4	
4	Curipe	3,388	182.9	318.5	182.9	318.5
	La Esperanza	619	33.4		33.4	
	Boqueron(La Penita)	1,367	73.8		73.8	
	Lagunetica	524	28.3		28.3	
5	San Diego	1,154	62.3	1,852.0	62.3	1,852.0
	Cortada de Maturín-Maitana	510	27.5		27.5	
	Agua Fria	1,086	58.6		58.6	
	San Jose de Los Altos	1,109	59.9		59.9	
	Los Amarillos	1,581	85.4		85.4	
	Paracotos	8,108	437.8		437.8	
	Palo Negro	669	36.1		36.1	
	Carrizal	20,079	1,084.3		1,084.3	
6	Tacata	1,570	84.8	105.9	84.8	105.9
	San Daniel	392	21.2		21.2	
7	Sabaneta	829	44.8	44.8	26.9	26.9
8	Aniagua	926	50.0	1,223.8	50.0	1,223.8
	Los Chaguaramos	1,719	92.8		92.8	
	La Providencia	848	45.8		45.8	
	Qubrada Honda	978	52.8		52.8	
	La Palmita	228	12.3		12.3	
	Cua	17,964	970.1		970.1	
9	Cua	71,856	3,880.2	10,940.0	3,880.2	10,827.0
	Las Mercedes de Cua	10,612	573.1		573.1	
	La Siempre Viva	3,239	174.9		174.9	
	Parques del Sur	269	14.5		14.5	
	Colonia Mendoza	2,522	136.2		136.2	
	Piloncito(La Cabrera)	6,682	360.8		360.8	
	Santa Barbara	2,773	149.7		149.7	
	Charallave	104,640	5,650.5		5,650.5	
10	Ocumare del Tuy	100,092	5,405.0	6,691.4	5,405.0	6,645.3
	Los Cajones	1,261	68.1		68.1	
	Las Yaguas	412	22.2		22.2	
	Sucuta	3,025	163.4		163.4	
	San Francisco de Yare	17,074	922.0		922.0	
	Parcelamiento de Yare	1,760	95.0		95.0	
	Pinango	291	15.7		15.7	
Total		482,351	-	26,046.9	-	25,729.2

**Table 2.3-4(5/9) Production and Effluent Load Projection from
Domestic Wastewater (BOD) (High : 2005)**

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	657	35.5	397.2	35.5	230.1
	Tovar	6,188	334.2		167.1	
	Jarillo	509	27.5		27.5	
2	La Mora	18,961	1,023.9	2,109.1	1,023.9	2,109.1
	El Consejo	20,097	1,085.2		1,085.2	
3	Sabaneta-Los Cerritos	22,290	1,203.6	3,283.9	1,203.6	3,283.9
	La Guruta-La Concepcion	4,400	237.6		237.6	
	Morocopo	1,002	54.1		54.1	
	Las Tejerias	33,122	1,788.6		1,788.6	
4	Curiepe	4,074	220.0	383.0	220.0	383.0
	La Esperanza	744	40.2		40.2	
	Boqueron(La Penita)	1,624	87.7		87.7	
	Lagunetica	649	35.1		35.1	
5	San Diego	1,371	74.0	2,158.6	74.0	2,158.6
	Cortada de Maturin-Maitana	606	32.7		32.7	
	Agua Fria	1,290	69.7		69.7	
	San jose de Los Altas	1,318	71.2		71.2	
	Los Amarillos	1,961	105.9		105.9	
	Paracotos	9,521	514.2		514.2	
	Palo Negro	785	42.4		42.4	
Carrizal	23,121	1,248.6	1,248.6			
6	Tacata	1,719	92.8	116.0	92.8	116.0
	San Daniel	429	23.2		23.2	
7	Sabaneta	908	49.0	49.0	29.4	29.4
8	Aniagua	1,288	69.5	1,701.2	69.5	1,701.2
	Los Chaguaramos	2,390	129.1		129.1	
	La Providencia	1,179	63.7		63.7	
	Qubrada Honda	1,359	73.4		73.4	
	La Palmita	316	17.1		17.1	
	Cua	24,972	1,348.5		1,348.5	
9	Cua	99,888	5,394.0	15,439.8	5,394.0	15,276.7
	Las Mercedes de Cua	14,752	796.6		796.6	
	La Siempre Viva	4,503	243.2		243.2	
	Parques del Sur	315	17.0		17.0	
	Colonia Mendoza	3,250	175.5		175.5	
	Piloncito(La Cabrera)	8,612	465.0		465.0	
	Santa Barbara	3,574	193.0		193.0	
	Charallave	151,028	8,155.5		8,155.5	
10	Ocumare del Tuy	129,002	6,966.1	8,729.3	6,966.1	8,665.2
	Los Cajones	1,625	87.8		87.8	
	Las Yaguas	530	28.6		28.6	
	Sucuta	3,899	210.5		210.5	
	San Francisco de Yare	23,744	1,282.2		1,282.2	
	Parcelamiento de Yare	2,448	132.2		132.2	
	Pinango	405	21.9		21.9	
Total		636,428		34,367.1		33,953.2

Table 2.3-4(6/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (High : 2010)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	769	41.5	464.3	41.5	266.5
	Tovar	7,324	395.5		197.8	
	Jarillo	505	27.3		27.3	
2	La Mora	21,960	1,185.9	2,454.7	1,185.9	2,454.7
	El Consejo	23,497	1,268.8		1,268.8	
3	Sabaneta-Los Cerritos	26,061	1,407.3	3,869.3	1,407.3	3,869.3
	La Gurúa-La Concepcion	5,144	277.8		277.8	
	Morocopo	1,171	63.3		63.3	
	Las Tejerías	39,277	2,121.0		2,121.0	
4	Curlepe	4,831	260.9	454.4	260.9	454.4
	La Esperanza	883	47.7		47.7	
	Boqueron(La Penita)	1,909	103.1		103.1	
	Lagunetica	792	42.8		42.8	
5	San Diego	1,611	87.0	2,493.2	87.0	2,493.2
	Cortada de Maturin-Maitana	712	38.4		38.4	
	Agua Fria	1,517	81.9		81.9	
	San Jose de Los Altas	1,549	83.7		83.7	
	Los Amarillos	2,392	129.1		129.1	
	Paracotos	11,160	602.6		602.6	
	Palo Negro	920	49.7		49.7	
Carrizal	26,308	1,420.6	1,420.6			
6	Tacata	1,876	101.3	126.6	101.3	126.6
	San Daniel	468	25.3		25.3	
7	Sabaneta	991	53.5	53.5	32.1	32.1
8	Aniagua	1,788	96.6	2,362.5	96.6	2,362.5
	Los Chaguaramos	3,319	179.2		179.2	
	La Providencia	1,637	88.4		88.4	
	Qubrada Honda	1,888	101.9		101.9	
	La Palmita	439	23.7		23.7	
	Cua	34,679	1,872.7		1,872.7	
9	Cua	138,716	7,490.7	21,789.8	7,490.7	21,554.6
	Las Mercedes de Cua	20,487	1,106.3		1,106.3	
	La Siempre Viva	6,253	337.7		337.7	
	Parques del Sur	370	20.0		20.0	
	Colonia Mendoza	4,186	228.0		228.0	
	Piloncito(La Cabrera)	11,090	598.9		598.9	
	Santa Barbara	4,602	248.5		248.5	
	Charallave	217,812	11,761.9		11,761.9	
10	Ocumare del Tuy	166,129	8,970.9	11,387.7	8,970.9	11,298.6
	Los Cajones	2,093	113.0		113.0	
	Las Yaguas	683	36.9		36.9	
	Sucuta	5,021	271.1		271.1	
	San Francisco de Yare	32,994	1,781.7		1,692.6	
	Parcelamiento de Yare	3,401	183.7		183.7	
	Pinango	563	30.4		30.4	
Total		841,778	-	45,456.0	-	44,912.5

Table 2.3-4(7/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (Low : 2000)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	423	22.9	284.4	22.9	165.6
	Tovar	4,400	237.6		118.8	
	Jarillo	444	24.0		24.0	
2	La Mora	12,226	660.2	1,359.0	660.2	1,359.0
	El Consejo	12,940	698.8		698.8	
3	Sabaneta-Los Cerritos	14,352	775.0	2,218.6	775.0	2,218.6
	La Guruta-La Concepcion	2,833	153.0		153.0	
	Morocopo	645	34.8		34.8	
	Las Tejerías	23,255	1,255.7		1,255.7	
4	Curipe	2,860	154.4	271.0	154.4	271.0
	La Esperanza	523	28.2		28.2	
	Boqueron(La Penita)	1,183	63.9		63.9	
	Lagunetica	453	24.5		24.5	
5	San Diego	998	53.9	1,519.1	53.9	1,519.1
	Cortada de Maturin-Maitana	441	23.8		23.8	
	Agua Fria	939	50.7		50.7	
	San Jose de Los Altas	960	51.8		51.8	
	Los Amarillos	1,368	73.9		73.9	
	Paracotos	7,014	378.7		378.7	
	Palo Negro	578	31.2		31.2	
Carrizal	15,834	855.0	855.0			
6	Tacata	1,205	65.0	81.3	65.0	81.3
	San Daniel	301	16.2		16.2	
7	Sabaneta	636	34.4	34.4	20.6	20.6
8	Aniagua	801	43.3	1,058.7	43.3	1,058.7
	Los Chaguaramos	1,487	80.3		80.3	
	La Providencia	734	39.6		39.6	
	Qubrada Honda	846	45.7		45.7	
	La Palmita	197	10.6		10.6	
	Cua	15,540	839.2		839.2	
9	Cua	62,160	3,356.6	9,463.9	3,356.6	9,366.2
	Las Mercedes de Cua	9,180	495.7		495.7	
	La Siempre Viva	2,802	151.3		151.3	
	Parques del Sur	232	12.5		12.5	
	Colonia Mendoza	2,182	117.8		117.8	
	Piloncito(La Cabrera)	5,780	312.1		312.1	
	Santa Barbara	2,399	129.5		129.5	
	Charallave	90,522	4,888.2		4,790.4	
10	Ocumare del Tuy	86,589	4,675.8	5,788.7	4,675.8	5,748.8
	Los Cajones	1,091	58.9		58.9	
	Las Yaguas	356	19.2		19.2	
	Sucuta	2,617	141.3		141.3	
	San Francisco de Yare	14,770	797.6		757.7	
	Parcelamiento de Yare	1,523	82.2		82.2	
	Pinango	252	13.6		13.6	
Total		408,872	-	22,079.1	-	21,808.9

Table 2.3-4(8/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (Low : 2005)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	448	24.2	285.0	24.2	164.9
	Tovar	4,448	240.2		120.1	
	Jarillo	381	20.6		20.6	
2	La Mora	12,855	694.2	1,433.0	694.2	1,433.0
	El Consejo	13,683	738.9		738.9	
3	Sabaneta-Los Cerritos	15,176	819.5	2,301.9	819.5	2,301.9
	La Guruta-La Concepcion	2,995	161.8		161.8	
	Morocopo	682	36.8		36.8	
	Las Tejerias	23,775	1,283.8		1,283.8	
4	Curipe	2,924	157.9	278.7	157.9	278.7
	La Esperanza	534	28.9		28.9	
	Boqueron(La Penita)	1,217	65.7		65.7	
	Lagunetica	487	26.3		26.3	
5	San Diego	1,027	55.5	1,570.4	55.5	1,570.4
	Cortada de Maturin-Maitana	454	24.5		24.5	
	Agua Fria	967	52.2		52.2	
	San Jose de Los Altas	988	53.3		53.3	
	Los Amarillos	1,469	79.3		79.3	
	Paracotos	7,133	385.2		385.2	
	Palo Negro	588	31.8		31.8	
	Carrizal	16,456	888.6		888.6	
6	Tacata	1,211	65.4	81.7	65.4	81.7
	San Daniel	302	16.3		16.3	
7	Sabaneta	640	34.6	34.6	20.7	20.7
8	Aniagua	965	52.1	1,274.5	52.1	1,274.5
	Los Chaguaramos	1,790	96.7		96.7	
	La Providencia	883	47.7		47.7	
	Qubrada Honda	1,018	55.0		55.0	
	La Palmita	237	12.8		12.8	
	Cua	18,709	1,010.3		1,010.3	
9	Cua	74,834	4,041.1	11,567.2	4,041.1	11,445.0
	Las Mercedes de Cua	11,052	596.8		596.8	
	La Siempre Viva	3,374	182.2		182.2	
	Parques del Sur	236	12.8		12.8	
	Colonia Mendoza	2,435	131.5		131.5	
	Piloncito(La Cabrera)	6,452	348.4		348.4	
	Santa Barbara	2,677	144.6		144.6	
	Charallave	113,146	6,109.9		6,109.9	
10	Ocumare del Tuy	96,643	5,218.7	6,539.7	5,218.7	6,491.6
	Los Cajones	1,217	65.7		65.7	
	Las Yaguas	397	21.5		21.5	
	Sucuta	2,921	157.7		157.7	
	San Francisco de Yare	17,788	960.6		912.5	
	Parcelamiento de Yare	1,834	99.0		99.0	
	Pinango	304	16.4		16.4	
Total		469,753	-	25,366.7	-	25,062.5

Table 2.3-4(9/9) Production and Effluent Load Projection from Domestic Wastewater (BOD) (Low : 2010)

Area No.	Name	Paroquia Population	Production (kg/day)	Total	Effluent (kg/day)	Total
1	El Conde	472	25.5	286.0	25.5	164.6
	Tovar	4,497	242.8		121.4	
	Jarillo	328	17.7		17.7	
2	La Mora	13,483	728.1	1,507.0	728.1	1,507.0
	El Consejo	14,425	779.0		779.0	
3	Sabaneta-Los Cerritos	16,000	864.0	2,375.6	864.0	2,375.6
	La Guruta-La Concepcion	3,158	170.5		170.5	
	Morocopo	719	38.8		38.8	
	Las Telerias	24,115	1,302.2		1,302.2	
4	Curiépe	2,966	160.2	284.1	160.2	284.1
	La Esperanza	542	29.3		29.3	
	Boqueron(La Penita)	1,239	66.9		66.9	
	Lagunetica	514	27.8		27.8	
5	San Diego	1,046	56.5	1,618.5	56.5	1,618.5
	Cortada de Maturin-Maitana	462	25.0		25.0	
	Agua Fria	985	53.2		53.2	
	San Jose de Los Altas	1,006	54.3		54.3	
	Los Amarillos	1,553	83.8		83.8	
	Paracotos	7,245	391.2		391.2	
	Palo Negro	598	32.3		32.3	
Carrizal	17,078	922.2	922.2			
6	Tacata	1,218	65.8	82.2	65.8	82.2
	San Daniel	304	16.4		16.4	
7	Sabaneta	644	34.7	34.7	20.8	20.8
8	Aniagua	1,161	62.7	1,533.7	62.7	1,533.7
	Los Chaguaramos	2,155	116.3		116.3	
	La Providencia	1,063	57.4		57.4	
	Qubrada Honda	1,225	66.2		66.2	
	La Palmita	285	15.4		15.4	
	Cua	22,513	1,215.7		1,215.7	
9	Cua	90,051	4,862.7	14,145.3	4,862.7	13,992.6
	Las Mercedes de Cua	13,300	718.2		718.2	
	La Siempre Viva	4,060	219.2		219.2	
	Parques del Sur	240	13.0		13.0	
	Colonia Mendoza	2,717	146.7		146.7	
	Piloncito(La Cabrera)	7,199	388.8		388.8	
	Santa Barbara	2,987	161.3		161.3	
	Charallave	141,397	7,635.4		7,482.7	
10	Ocumare del Tuy	107,845	5,823.6	7,392.5	5,823.6	7,334.7
	Los Cajones	1,359	73.4		73.4	
	Las Yaguas	443	23.9		23.9	
	Sucuta	3,260	176.0		176.0	
	San Francisco de Yare	21,419	1,156.6		1,098.8	
	Parcelamiento de Yare	2,208	119.2		119.2	
	Pinango	365	19.7		19.7	
Total		541,846	-	29,259.7	-	28,913.8

Table 2.3-5 (1/3) Effluent Pollution Load Projection (BOD)

(Standard :2000)

Basin No.	Name of Main Area	Industrial Wastewater (kg/day)	Livestock Wastewater (kg/day)	Domestic Wastewater (kg/day)	Total (kg/day)	Rate (%)
1	Tovar	28	0	182	210	0.3
2	El Consejo	25,478	0	1,636	27,113	39.6
3	Las Tejerias	4,226	2,286	2,516	9,028	13.2
4	Qda.Guayas	904	936	297	2,138	3.1
5	Paracotos	739	0	1,796	2,536	3.7
6	R.Guare	0	1,134	129	1,263	1.8
7	Cua	79	15	1,187	1,281	1.9
8	Charallave	4,356	729	10,501	15,586	22.8
9	Ocumare del Tuy	2,907	0	6,445	9,352	13.7
	Total	38,718	5,100	24,690	68,508	100.0

(Standard : 2005)

Basin No.	Name of Main Area	Industrial Wastewater (kg/day)	Livestock Wastewater (kg/day)	Domestic Wastewater (kg/day)	Total (kg/day)	Rate (%)
1	Tovar	42	0	197	239	0.2
2	El Consejo	51,853	0	1,783	53,636	49.7
3	Las Tejerias	6,133	2,286	2,776	11,196	10.4
4	Qda.Guayas	1,355	936	336	2,627	2.4
5	Paracotos	1,162	0	2,033	3,195	3.0
6	R.Guare	0	1,134	137	1,271	1.2
7	Cua	110	15	1,602	1,727	1.6
8	Charallave	6,177	729	14,385	21,291	19.7
9	Ocumare del Tuy	4,479	0	8,159	12,639	11.7
	Total	71,312	5,100	31,408	107,820	100.0

(Standard : 2010)

Basin No.	Name of Main Area	Industrial Wastewater (kg/day)	Livestock Wastewater (kg/day)	Domestic Wastewater (kg/day)	Total (kg/day)	Rate (%)
1	Tovar	64	0	213	277	0.2
2	El Consejo	91,887	0	1,926	93,814	56.5
3	Las Tejerias	9,028	2,286	3,037	14,351	8.6
4	Qda.Guayas	2,038	936	376	3,350	2.0
5	Paracotos	1,804	0	2,281	4,085	2.5
6	R.Guare	0	1,134	145	1,279	0.8
7	Cua	157	15	2,161	2,333	1.4
8	Charallave	8,941	729	19,719	29,389	17.7
9	Ocumare del Tuy	6,866	0	10,337	17,203	10.4
	Total	120,786	5,100	40,194	166,080	100.0

Table 2.3-5 (2/3) Effluent Pollution Load Projection (BOD)

(High : 2000)

Basin No.	Name of Main Area	Industrial Wastewater (kg/day)	Livestock Wastewater (kg/day)	Domestic Wastewater (kg/day)	Total (kg/day)	Rate (%)
1	Tovar	30	0	198	228	0.3
2	El Consejo	27,430	0	1,785	29,216	40.6
3	Las Tejerias	4,405	2,286	2,746	9,437	13.1
4	Qda.Guayas	946	936	318	2,201	3.1
5	Paracotos	763	0	1,852	2,615	3.6
6	R.Guare	0	1,134	133	1,267	1.8
7	Cua	82	15	1,224	1,320	1.8
8	Charallave	4,519	729	10,827	16,075	22.3
9	Ocumare del Tuy	3,027	0	6,645	9,672	13.4
	Total	41,202	5,100	25,729	72,031	100.0

(High : 2005)

Basin No.	Name of Main Area	Industrial Wastewater (kg/day)	Livestock Wastewater (kg/day)	Domestic Wastewater (kg/day)	Total (kg/day)	Rate (%)
1	Tovar	52	0	230	282	0.2
2	El Consejo	67,075	0	2,109	69,184	53.4
3	Las Tejerias	7,444	2,286	3,284	13,014	10.0
4	Qda.Guayas	1,660	936	383	2,979	2.3
5	Paracotos	1,364	0	2,159	3,523	2.7
6	R.Guare	0	1,134	145	1,279	1.0
7	Cua	130	15	1,701	1,846	1.4
8	Charallave	7,384	729	15,277	23,390	18.1
9	Ocumare del Tuy	5,405	0	8,665	14,071	10.9
	Total	90,515	5,100	33,953	129,568	100.0

(High : 2010)

Basin No.	Name of Main Area	Industrial Wastewater (kg/day)	Livestock Wastewater (kg/day)	Domestic Wastewater (kg/day)	Total (kg/day)	Rate (%)
1	Tovar	91	0	267	358	0.2
2	El Consejo	136,998	0	2,455	139,453	61.3
3	Las Tejerias	12,730	2,286	3,869	18,885	8.3
4	Qda.Guayas	2,903	936	454	4,294	1.9
5	Paracotos	2,440	0	2,493	4,933	2.2
6	R.Guare	0	1,134	159	1,293	0.6
7	Cua	215	15	2,363	2,592	1.1
8	Charallave	12,382	729	21,555	34,666	15.2
9	Ocumare del Tuy	9,594	0	11,299	20,893	9.2
	Total	177,352	5,100	44,913	227,365	100.0