Table 1: Crop uptake and general nutrient recommendations for crops grown in the Caribbean Area										
Crop	**Crop uptake (lbs./acre/year)**				**Nutrient recommendation [1] (lbs./acre/year)**					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Avocado [2]	36	9	44	28,800						
Avocado first year after planted					13 - 9	3 - 2	7 - 5			Total amount split into 3 applications using a complete fertilizer mixture. Apply high level to high density (70 pl./acre) or low level to low density (48 pl./acre), respectively.
Avocado second year after planted					17 - 25	4 - 6	9 - 14			Total amount split into 2 applications using a complete fertilizer mixture. High density (70 pl./acre).
					12 - 17	2 - 4	6 - 10			Total amount split into 2 applications using a complete fertilizer mixture. Low density (48 pl./acre).
Avocado third year after planted					21 - 42	5 - 9	35 - 70			Total amount split into 2 applications using a complete fertilizer mixture. High density (70 pl./acre).
					19 - 29	4 - 6	32 - 48			Total amount split into 2 applications using a complete fertilizer mixture. Low density (48 pl./acre).
Avocado fourth years after planted					42 - 56	9 - 12	70 - 93			Total amount split into 2 applications using a complete fertilizer mixture. High density (70 pl./acre).
					29 - 38	6 - 8	48 - 64			Total amount split into 2 applications using a complete fertilizer mixture. Low density (48 pl./acre).
Avocado fifth years after planted					56 - 70	12 - 15	93 - 116			Total amount split into 2 applications using a complete fertilizer mixture. High density (70 pl./acre).
					38 - 48	8 - 10	64 - 80			Total amount split into 2 applications using a complete fertilizer mixture. Low density (48 pl./acre).

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Avocado sixth years after planted					84 - 140	18 - 30	193 - 232			Total amount split into 2 applications using a complete fertilizer mixture. High density (70 pl./acre).
					58 - 96	12 - 21	95 - 156			Total amount split into 2 applications using a complete fertilizer mixture. Low density (48 pl./acre).
Avocado tenth or more years after planted					140	30	232			Total amount split into 2 applications using a complete fertilizer mixture. High density (70 pl./acre).
					96	21	156			Total amount split into 2 applications using a complete fertilizer mixture. Low density (48 pl./acre).
Bananas [3]	247	20	633		264 - 432	19 - 31	548 - 896	52	26,000 to 52,000	These nutrients are provided from complete fertilizer mixture recommended. Split this amount into four applications in soils with N, P and K low-test categories. Apply low N, P and K levels in low-density 721 pl./acre) and the high levels in high density (906 pl./acre).
Beans [4]	90	16	179	890	21 - 31	0 - 4 9 - 13 15 - 25	0 - 18 30 - 47 64 - 94		2,100	N: apply this amount pre-plant and at flowering. P and K: Apply these amounts when P and K levels are in the high, medium, and low categories,respectively.
Cabbage	90	13	100	30,000 [5]	103 - 155	43	66		35,000	Split apply this amount (post-plant and during head cabbage formation) if soil N level is under high test category. Apply P and K amount if soils test level is not in high categories.
	268	27	205	62,000 [6]						Crop does not respond to fertilizer application in most fertile soils.
Cassava [7]	182	5	164	19,808	30 - 40	13 - 17	50 - 66		30,000	These nutrients are provided from a complete fertilizer mixture recommended. Split total amount in two applications (first and third month after after planted) in soils with N, P and K low test categories. Apply low N, P and K levels in low density (2,723 pl./acre) and the high levels in high density (4,840 pl./acre).

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Citrus_Oranges [8]	38	4	56	48,000 Var. Valencia						
Citrus first year after planted					34 - 19	15 - 8	23 - 12			Total amount split into 3 applications using complete fertilizer mixture. Apply high level to high density (222 pl./acre) or low level to low density (121-pl./acre), respectively.
Citrus second and third year after planted					103 - 56	18 - 10	57 - 31			Total amount split into 2 applications using complete fertilizer mixture. Apply high level to high density (222 pl./acre) or low level to low density (121-pl./acre), respectively.
Citrus fourth year after planted					206 - 274	35 - 47	114 - 152			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre).
					112 - 150	19 - 26	62 - 83			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre).
Citrus fifth year after planted					229 -343	49 - 59	190 - 380			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre).
					125 - 187	27 - 32	103 - 207			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre).
Citrus sixth year after planted					274 - 412	59 - 71	228 - 456			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre).
					150 - 224	32 - 38	124 - 248			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre).

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Citrus seventh year after planted					320 - 481	69 - 83	266 - 532			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre).
					175 - 261	37 - 44	145 - 290			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre).
Citrus eighth years after planted					366 - 553	79 - 95	303 - 607			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre).
					200 - 299	43 - 51	166 - 331			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre).
Citrus ninth years after planted					412 - 662	89 -106	342 - 683			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre).
					225 - 335	48 - 58	186 - 372			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre).
Citrus tenth years after planted					457 - 731 (572 - 858)	98 - 118 (123 - 147)	380 - 759 (475 - 949)			Total amount split into 2 applications using complete fertilizer mixture. High density (222 pl./acre). Maximum level amounts reached after 10 years are in parenthesis.
					249 - 374 (312 - 467)	54 - 64 (67 - 80)	207 - 413 (259 - 517)			Total amount split into 2 applications using complete fertilizer mixture. Low density (121 pl./acre). Maximum level amounts reached after 10 years are in parenthesis.

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Coffee [6]	228	17	205	2, 000					2, 000	
Coffee first year after planted					91 - 137	39 - 59	38 - 57	17 - 25		Total amount split into 4 applications using complete fertilizer mixture when soils is in low N, P, and K categories. High density (1,815 pl./acre).
					56 - 82	24 - 35	23 - 34	10 - 14		Total amount split into 4 applications using complete fertilizer mixture when soils is in low N, P, and K categories. Low density (1,089 pl./acre).
Coffee second year after planted					182 - 228	78 - 98	121 - 149	33 - 41		Total amount split into 4 applications using complete fertilizer mixture when soils is in low N, P, and K categories. High density (1,815 pl./acre).
					109 - 137	47 - 59	73 - 91	20 - 25		Total amount split into 4 applications using complete fertilizer mixture when soils is in low N, P, and K categories. Low density (1,089 pl./acre).
Coffee third year after planted					307 - 409	44 - 59	254 - 336	37- 49		Total amount split into 3 applications using complete fertilizer mixture when soils is in low N, P, and K categories. High density (1,815 pl./acre).
					184 - 245	27 - 35	154 - 204	23 - 30		Total amount split into 3 applications using complete fertilizer mixture when soils is in low N, P, and K categories. Low density (1089 pl./acre)

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Coffee fourth year after planted					409 - 819	59 - 117	336 - 680	47 - 98		Total amount split into 3 applications using complete fertilizer mixture when soils is in low N, P, and K categories. High density (1,815 pl./acre).
					245 - 491	35 - 70	204 - 408	30 - 59		Total amount split into 3 applications using complete fertilizer mixture when soils is in low N, P, and K categories. Low density (1,089 pl./acre)
Cucumber	45	36	71	26,710	155 - 206	23	43		24,750	N: Apply this amount by fertigation. Apply low or high N levels if soil total N test is in high or lower test categories, respectively. 50 lbs. of N can be applied pre-plant. P and K, apply this amount pre-plant if soil test P and K are medium or low.
Eggplant					103	21 - 103	21 - 129		25,000	Apply this N amount pre-plant, and sidedress at flowering. Apply low P and K or high P and K levels if soil test P and K are in high or lower test categories, respectively.
Grass [9]_Congo	304	49	401	29,815	330-300	48 - 44	189 - 171			Dry Matter. N, P, and K level are for low soil test categories These nutrients are provided from complete fertilizer mixture recommended. Total amount split into 4 applications. Apply high level to hay green shop and low level to forage grazing. . N level applies in hay and green shop may increase up to 600 lb./acre and P level up to 60 lb./acre.
Grass [9]_Guinea	288	44	362	22,962						
Grass [9]_Malojillo	306	43	382	23,941						
Grass [9]_Napier	301	64	502	25,908						
Grass [9]_Pangola	298	47	356	23,585						
Grass [9]_Star	345	58	418	25,187						
Grass_Rice [15]	110	22	116	5,000	120	11	54		5,000	Total amount split into two applications in soils with N, P and K low test categories.
Grass_Sorghum [6]	196	29	235	14,400						

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Grass_Sugarcane	105	23	185[10]		185 - 120	77 - 20	216 - 50			New seedlings; apply low or high levels if soil test are in high or lower test categories, respectively.
	75	22	149 [5]	100,000	124 -144	0 - 66	0 -171			Suckers; apply low or high levels if soil test are in high or lower test categories, respectively.
Lettuce [11]	107	13	191	36,000						
Malanga - Taro (Caladium)					80	34	108		16,000	These nutrients are provided from a complete fertilizer mixture recommended. Apply this amount in soils with N, P and K low-test categories.
Mango [12]	93	11	88	14,256						
Mango 6 months after planted					3 - 7	1 - 2	2 - 4			Apply low and high level amount in low (41 pl./acre) and high density (109 pl./acre), respectively.
Mango first year after planted					13 - 20	3 - 4	9 - 14			Apply low level early in the year and high level six months later. High density (109 pl./acre).
					5 - 7	1 - 2	3 - 5			Apply low level early in the year and high level six months later. Low density (41 pl./acre).
Mango second year after planted					26 - 33	6 - 7	18 - 23			Apply low level early in the year and high level six months later. High density (109 pl./acre).
					10 - 12	2 - 3	7 - 9			Apply low level early in the year and high leve! six months later. Low density (41 pl./acre).
Mango third year after planted					39 - 46	9 - 10	27 - 32			Apply low level early in the year and high level six months later. High density (109 pl./acre).
					15 - 17	3 - 4	10 - 12			Apply low level early in the year and high level six months later. Low density (41 pl./acre).

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Mango fourth year after planted					52 - 59	12 - 13	36 - 41			Apply low level early in the year and high level six months later. High density (109 pl./acre).
					20 - 22	4 - 5	14 -15			Apply low level early in the year and high level six months later early. Low density (41 pl./acre).
Mango fifth year after planted					65 - 72	15 - 16	45 - 50			Apply low level early in the year and high level six months later. High density (109 pl./acre).
					25 - 27	5 - 6	17 - 18			Apply low level early in the year and high level six months later. Low density (41 pl./acre).
Mango eigth or more year after planted					25 - 75	5 - 15	17- 51			Total amount applies using a complete fertilizer mixture. High density (109 pl./acre). Amount level applies increases with production.
					65 - 195	15 - 45	45 - 135			Total amount applies using a complete fertilizer mixture. Low density (41 pl./acre). Amount level applies increases with production.
Onion					155 - 206	23	43		24,750	N: Apply this amount by fertigation; Apply low or high N levels if soil total N test is in high or lower test categories, respectively. 50 lbs. of N can be applied apre-plant. P and K, apply this amount pre-plant.
Papaya [13]	156	18	187	80,000	23	10	19		121,500	Apply this amount after transplant.
					34 - 45- 56	15- 19 - 24	28--37- 46			Apply this amount 1, 2 and 3 months after transplant, respectively
					90	39	75			Apply monthly this amount from 4 - 14 months after transplant.

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Peppers [11]	140	12	140		155	41 - 67	25 - 30		25,000	N applied via drip irrigation. Apply low P and K or high P and K levels if soil test is in high or lower soil test categories, respectively.
					103					Apply this N amount pre-plant, and sidedress at flowering.
Pigeon Peas										Crop does not respond to fertilizer application in most fertile soils.
Pineapple [14]	182	22	290	49,005	300 - 399 (173)	21 - 32 (50)	207- 248 (144)		48,000	These nutrients are provided from complete fertilizer mixture recommended. Total amount split into 3 applications (1-2 months, 4-5 months and 8-9 months post- plant). The Land Authority producers in the north part of Puerto Rico use N, P, and K levels in parenthesis.
Plantains [15]	215	19	521		288	25	598	52		
Pumkin [5]	96	11	93	24,000	103 - 155	44	66		24,000	Apply this N amount pre-plant, and during the first 1.5 months after transplant. Apply P and K amounts if soil test P and K are in the low category.
Sorghum (grain) [6]	247	39	164	8,000						
Sweet Corn [11]	155	20	105	8,000						
Sweet Pepper					103	44	68		8,750	Apply this amount split in 6 applications via drip irrigation at 2-week intervals.
					50	22	33			Apply this amount as pre-plant. Not fertigated field applies this amount as sidedress at flowering and harvesting.

Crop	Crop uptake (lbs./acre/year)				Nutrient recommendation [1] (lbs./acre/year)					
	N	P	K	Yield (Fresh weight)	N	P	K	Magnesium (Mg)	Average Yield (Fresh weight)	Comments
Sweet Potato					48 - 60	21 - 26	80 - 100		25,000	These nutrients are provided from a complete fertilizer mixture recommended. Apply this amount in soils with N, P and K low-test categories.
Tabacco [6]	125	11	211	3,000						
Tanier	273	74	371	20,827 [16] var. Blanca	88 - 138	19 - 30	110 - 171	16 - 25	8,000	These nutrients are provided from a complete fertilizer mixture recommended. Apply this amount in soils with N, P and K low-test categories. Apply low N, P and K levels in low density (7000 pl./acre) and the high levels in high density (11000 pl./acre).
	129	36	196	10,071 [16] var. Kelly						
	111	13	139	var. Morada [17]						
Tomatoes [11]	180	21	280		155	41- 67	66		35,000	N applied via drip irrigation. Apply low P or high P levels if soil test P is in high or lower soil test categories, respectively. Apply K level if soil level is in medium or lower test categories.
					103					Apply this N amount pre-plant, and sidedress at flowering.
Watermelon	40	5	54	10,000 [5]	88- 103	24 - 4 - 67	85 - 29 -171		24,000	N: Split apply this amount pre-plant, and 1 month after transplanting. N, P and K: apply this amount when soil test is in high, medium or low category, respectively
	64	9	96	16,000 [6]						
Yam	169	22	191	45,924 [18] Var. Florido	147	218	63 - 94	198 - 294	20,000	These nutrients are provided from a complete fertilizer mixture recommended. Apply this amount in soils with N, P and K low-test categories, one month after seed sprout. Apply low N, P and K levels in low density (7,260 pl./acre) and the high levels in high density (10,890 pl./acre).
	105	106	142	28,256 [19] Var. Florido						
	190	17	199	52,300 [20] Var Guinea						

References

1 Data summarized from "Conjuntos Tecnologicos, University of Puerto Rico, Agricultural Experiment Station by Agronomist Jose A. Castro, USDA, NRCS and Dr. David Sotomayor, College of College of Agricultural Science, UPR, Mayaguez Campus. Soil test or plant tissues analyses could change these recommendations.

2 Avilan et al., 1978.

3 Publicaci6n 97, marzo 1995

4 Schoonho ven, et al.,1993

5 Muniz Torres, Oscar, 1992.

6 Agricultura de las Américas, Septiembre 1986

7 Irizarry and Rivera, 1983.

8 Tucker et al., 1995.

9 Bulletin 233, February 1974.

10 CENICANA, Cali, Colombia

11 Maynard and Hochutt,1997

12 Laborem et al., 1979.

13 Cunha and Haag, 1980.

14 De Geus, 1973.

15 Boletin 150, UPR, AES, marzo 1977.

16 Goenaga and Chardon, 1993.

17 Vicente Chander et. Al., 1982

18 Irizarry and Rivera, 1985.

19 Barahona, 1976.