Joint symposium on maize and peanut. Held in Suriname
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The Agricultural Experiment Station of Paramaribo.

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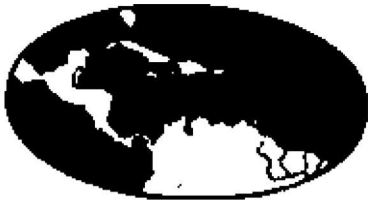

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POTENTIALS AND PROBLEMS OF PEANUT PRODUCTION IN ST. KITTS

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The peanut industry in St. Kitts is reviewed. An account of the production systems practised by small farmers and the large National Agricultural Corporation (NACO) is given.

Yields for the island are given together with the main plant protection problems encountered and the control measures are listed.

Experimental results from St. Kitts are summarised from trials designed to demonstrate (1) the effects of spacing on yield on the local Valencia variety (2) yields of three introduced varieties.

Current Caribbean production and consumption are reviewed as well as the strategies and technologies for increasing the crop profitability.

INTRODUCTION

The groundnut or peanut, *Arachis hypogaea* L., has been grown in St. Kitts for over fifty years. The crop was generally cultivated by small farmers (mostly estate workers) on the marginal lands not being utilised for sugar cane cultivation. Plots were very small, mostly less than 25 acres.

In spite of the smallness of the plots peanut has been an important snack food to the majority of the St. Kitts population. It was a Saturday evening tradition for the children to obtain their small packets of roasted nuts from the roadside vendors who thus had a lucrative business.

The estate workers, who were the only producers of the crop often used immature peanuts as a vegetable after the full pods were selected. The immature pods were boiled and served as a cooked vegetable.

With the uncertainty of the sugar market, together with Governments policy diversifying the economy, increased peanut production was undertaken by the National Agricultural Corporation (NACO). Since 1975 NACO has, as a matter of policy, cultivated peanuts as an intercrop with sugarcane or as a pure stand on sugar cane fields that are being left fallow.

LOCATION, SIZE and CLIMATE

The island of St. Kitts (St. Christopher) is an associated state of the United Kingdom located between 17^{o} 13' and 17^{o} 25' and longitude 62^{o} and 63^{o} W. The total area of the island is 65 square miles.

Because of its size and location the climate is tropical and maritime. Diurnal temperature

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variations are small. The average yearly maximum and minimum temperatures for the island are 31°C and 24°C respectively. At the highest elevations (900ft and above) lower temperatures with minimum of 15°C being experienced between January and February. The relative humidity ranges between 65% and 89%. The prevailing wind is the Easterly Trades with an average velocity of 10 to 12 miles per hour. These winds exert a desiccating effect on the soils thus effectively increasing the number of dry months.

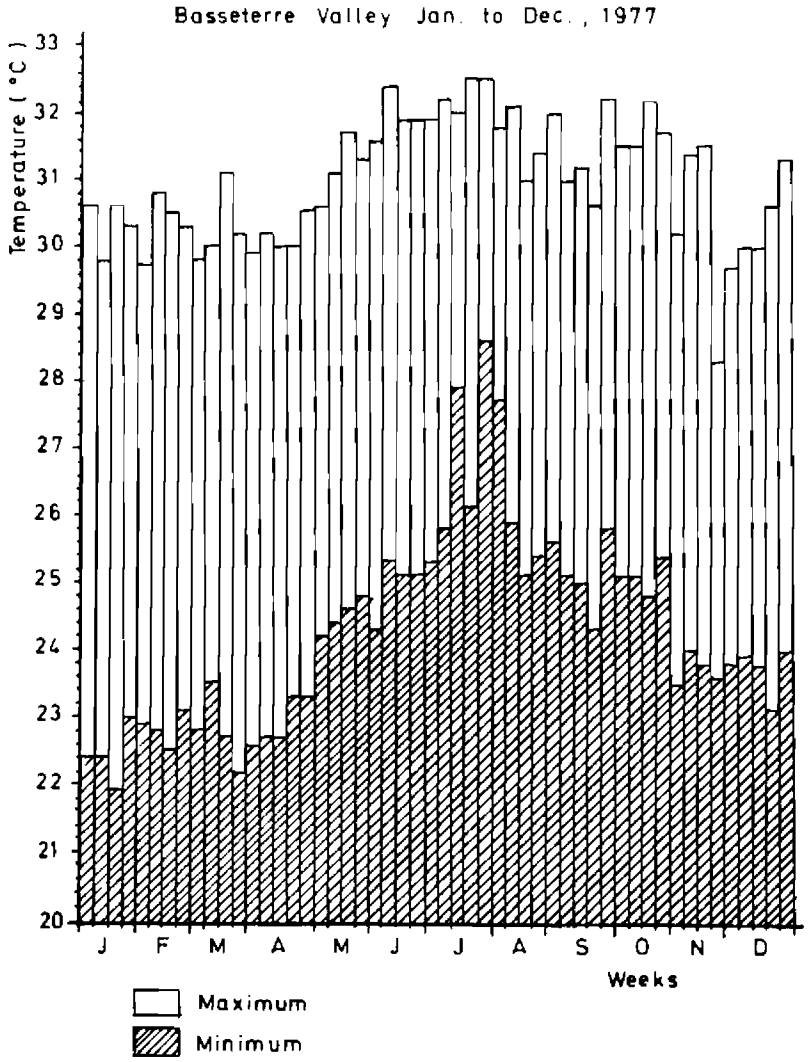

Fig.1. Mean maximum and minimum temperature at Basseterre Valley.

Figure 1 shows the mean maximum and minimum temperature recorded at the Basseterre Valley for 1977, the region where the experiments were conducted.

Rainfall and open pan evaporation data collected at Basseterre Sugar Agronomy about one mile from the experimental site are depicted in figure 2. The data show that rainfall is a major constraint to agricultural production. The records for 1977 indicate only three weeks when rainfall exceeded evaporation. There were few occasions when weekly rainfall exceeded 4.6 cm. Though July to early December could be considered the wet months, irrigation was necessary for good crop yields.

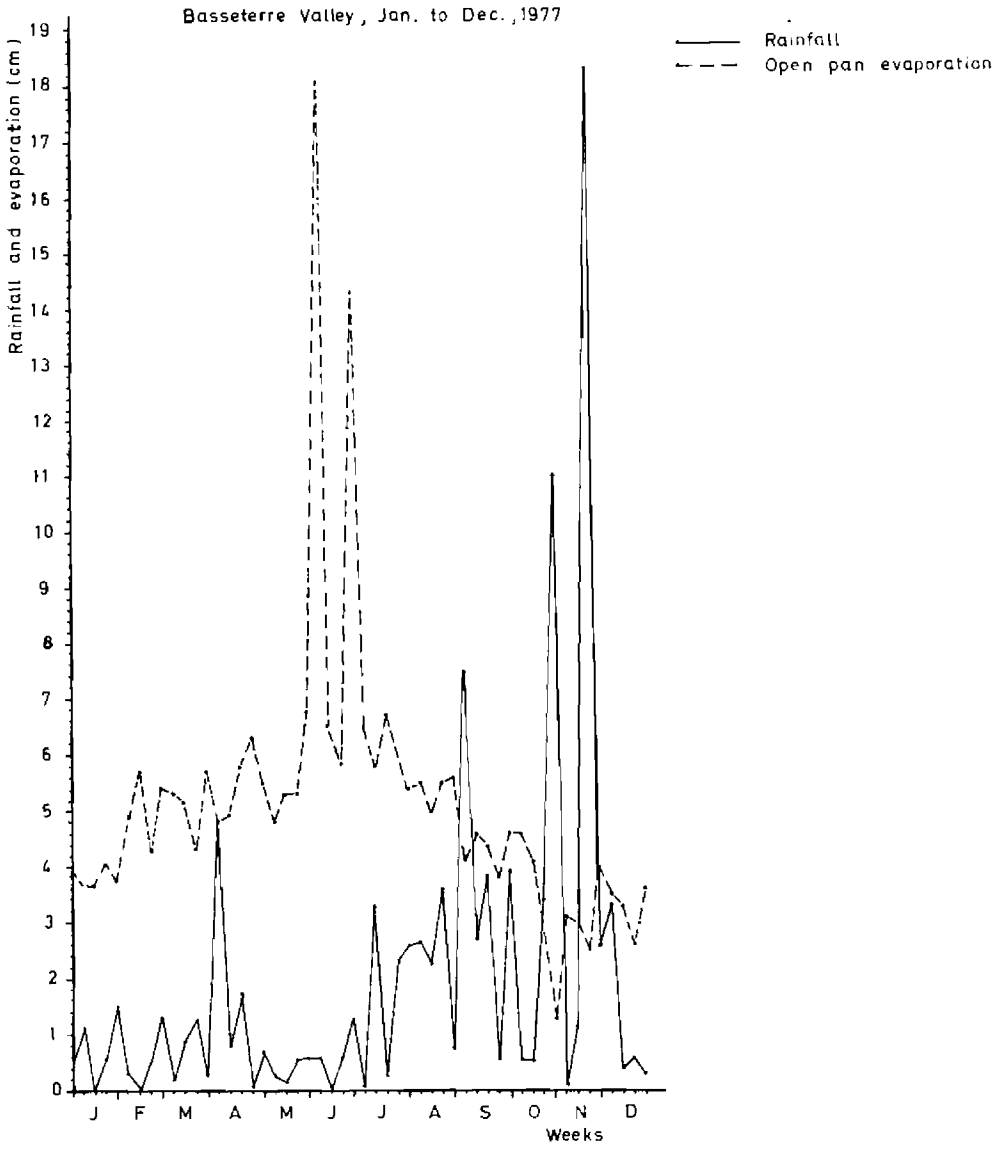

Fig.2. Rainfall and open pan evaporation at Basseterre Valley.

SOIL

The soils of St. Kitts have been described (Lang and Carrol,1966). A brief description of the more important agricultural types are:

(i) Protosols — Raw soils having a dominantly sandy texture being sandy loam to loamy sand. Derived from beach sand and volcanic ash they are considered moderately fertile and freely drained.

(ii) Young soils — Shallow, immature soils with a relatively high content of unweathered primary minerals.

(iii) Latosolics — Moderately mature soils developed on fragmented volcanic materials under relatively wet and humid conditions. There is a fair amount of clay.

(iv) Smectoid clays — Moderately mature soil formed over andesitic agglomerates. The unweathered primary minerals differ according to the degree of slope.

The experimental area is located in the protosols of the Basseterre Valley. It is of a fine gritty texture over loose volcanic ash. The series show signs of incipient cementation and is liable to wind deflation and gullies during heavy rains. table 1 presents some physical and chemical properties of the experimental site.

Table 1. Some physical and chemical data of the soil at the experimental site in the Basseterre Valley, 1977.

Coarse sand (% oven dry soil)	45
Fine sand "	28
Silt "	13
Clay "	13
C "	3.2
N "	0.25
C/N	12.8
% Base Sat^{n}	100
Truog P (ppm)	121
pH	5.8
C.E.C (m.e. per 100g oven dry soil)	9.3
Ca "	7.4
Mg "	3.0
K "	0.52
Na "	0.25
Elec cond. (mhos x 10^{-6})	177

PRODUCTION SYSTEMS

The production systems practiced in St. Kitts are as follows:

1. Small farmers produce peanuts by tilling the land with hoes making ridges six to nine inches high. The seeds are then planted by hand six to twelve inches apart. By the time young plants are four to eight weeks they are mound once or twice both to keep the weeds down and to increase the coverage of the plant base with soil.
   No pest control is practiced nor is any fertilizer used. Harvesting is by hand, sometimes using a hoe to help break back the ridge. The pods are removed from the plant by hand then dried in the sun on mats or any firm surface.

2. NACO and large farmers practice partial mechanization. Tractor is used to plough and harrow the soil to a fine till. Fertilizer is usually incorporated in the final land preparation. On pure stands the field is left flat but where intercropping is practiced, ridges are made 4.5 to 5 feet apart with the peanut seeded on the ridges while sugar cane is planted in the furrows.
   Seeds are sown 1, 4, 6 or 8 rows spaced 16 to 18 inches apart depending on the seeder used. The soil is then treated with a pre-emergence weedicide (usually alachlor).
   Should any weed control become necessary this is done manually.
   Insecticides and fungicides are applied with either knapsacks, mistblowers or tractor boom sprayers.
   At harvesting the plants are wind rowed either mechanically or by hand and left in the field 24 to 48 hours. The pods are then removed by hand and transported to sheds where they are placed in wire mesh containers to dry.

ST. KITTS PEANUT INDUSTRY

St. Kitts is both an importer and exporter of peanuts. Since 1975 NACO has been the major producer. Most of the planting takes place between September and February. This allows for seeding during the rains while harvesting takes place during the early dry season. Table 2 shows NACO production for 1976-1978.

Table 2. Groundnut production (NACO)

	1976 – 1977		1977 – 1978	
	Acres	Yield (lbs)	Acres	Yield (lbs)
Pure stand	7.5	7932	126.75	104993
Intercropping	175	80652	51.75	31602
+Mixed	144.5	51515	–	–
Totals	327	140099	178.50	136595

+ Mixed: areas of intercropping as well as pure stands.

Table 3. Groundnut and Groundnut products imported into St. Kitts 1968 – 1977 – Kitts 1968 – 1977

Country	1968		1969		1970		1971		1972		1973		1974		1975		1976		1977	
of Origin	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC
Barbados	–	–	–	–	–	–	475	100	–	–	–	–	–	–		–	–	–	–	–
Jamaica	–	–	–	–	–	–	–	–	130	222	–	–	10000	5222		–	–	–	–	–
St. Lucia	–	–	5360	486	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–
Trinidad & Tobago	40	53	114	128	–	–	–	–	426	188	130	136	125	178	4070	5206	1228	3286	2124	6881
U.S. Virgin Islands	–	–	–	–	–	–	–	–	–	–	–	–	30	157	30	30	–	–	–	–
Netherland Antilles	–	–	–	–	–	–	–	–	–	–	–	–	–	–	80	80	–	–	–	–
Puerto Rico	–	–	60	117	–	–	140	73	–	–	–	–	–	–	–	–	–	–	–	–
USA	63	128	1220	1663	763	1380	879	1419	1429	2338	1014	1506	1149	1731	1586	4622	15045	36186	–	–
Canada	1653	1487	292	501	791	971	489	746	472	796	145	138	529	830	270	736	–	–	–	–
U.K	1414	3385	6370	7501	6769	7534	7690	8996	5352	7536	2542	4253	4126	7090	3051	8275	–	–	–	–
Netherlands	11184	4447	10160	1015	4275	2262	210	440	–	–	–	–	–	–	–	–	–	–	–	–
Br. African Cou/y	1100	430	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Egypt	–	–	–	–	3234	1750	660	360	–	–	–	–	–	–	1650	1881	–	–	–	–
Israel	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9900	29557	–	–
Syria	968	395	–	–	–	–	–	–	–	–	1650	1205	–	–	–	–	–	–	–	–
Madagacar	–	–	–	–	1100	564	–	–	–	–	2750	1777	–	–	–	–	–	–	–	–
China	–	–	550	279	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Brazil	–	–	–	–	–	–	–	–	100	532	–	–	–	–	–	–	–	–	–	–
Totals	9122	10325	24126	116900	6932	14461	10543	12134	7909	11612	8231	9015	15959	15158	10737	20830	26173	69029	2124	6881

Source Statistics Office, St. Kitts

Table 3 lists the imports of peanuts and peanut products into St. Kitts from 1968 to 1977. Over this 10 year period the country spent $173,035 EC. with the USA being the most consistent supplier. Though Trinidad and Tobago exported the commodity to St. Kitts it is to be noted that the product is only re-export as Trinidad has no commercial peanut production.

The figures on export (table 4) indicate fluctuations. In 1977 the reduction was due to the lower acreage under cultivation as a result of shortage in planting materials and drought conditions. Production of peanut is totally rain fed.

Table 4. Groundnut export from St. Kitts 1975 – 1977

Country	1975		1976		1977	
	lbs	$ EC	lbs	$EC	lbs	$ EC
Antigua	5000	6000	7846	9823	3000	4200
Barbados	–	–	82400	98880	–	–
Dominica	–	–	40	40	70	50
Grenada	–	–	210	210	50	50
Guyana	–	–	50000	60000	–	–
Montserrat	1680	2008	3050	3100	1250	1525
Netherland Antilles	80	80	1620	2200	115	130
Surinam	–	–	35000	42000	–	–
Trinidad & Tobago	–	–	22050	26450	66240	86112
U.S. Virgin Island	30	30	2149	1774	380	360
Totals	6790	8118	204365	244507	71025	82447

St. Kitts with fertile sandy loam soils is ideally suited for peanut production. The added advantage of having lands with a gradient of 0-10^{o} makes for mechanization. Major constraints are availability of water at the production site. The other problems encountered by the industry can be listed as:

1. unavailability of dryers during the rainy season
2. inefficient harvesting, resulting in about 2-5 percent of the pods being left in the field.
3. manual grading of the pods thus adding significantly to the cost of production.
4. inadequate storage facilities.
5. plant protection. This can be itemised as weed, pest and disease.

WEED CONTROL

A newly prepared field just out of sugar-cane be kept free of weeds for 4-8 weeks by one application of prometryne (2 kg a.i/ha), nitrofen (2 kg a.i/ha) diphenamid (6 kg a.i./ha) or alachlor (3 to 3.25 kg a.i./ha) as a pre-emergence. On land that was recently cultivated with vegetables no weedicide gives adequate control and therefore paraquat (0.75 kg a.i./ha) and hand-hoeing has to be employed.

PEST CONTROL

The ecological niche of the peanut crop is rich in animal species. In St. Kitts a few pests are of economic significance. *Spodoptera sunia* is the major caterpillar between September and December. *Spodoptera frugiperda, Spodoptera exigua* and *Heliothis zea* can sometimes be a problem. Recently mealy bugs (not yet identified) became a problem during the dry season. Recommendations for chemical control are show in table 5.

Table 5. Recommendations for insect chemical control

Insects	Chemicals % a.i.		
	Dimethoate	Trichlorphon	Methamidophos
Spodoptera sunia	0.1	0.24-0.32	0.05
Spodoptera frugiperda	0.08	0.24	–
Spodoptera exigua	0.08	0.24	–
Heliothis zea	0.08	0.24	–
Mealy bug	0.1	–	0.05

DISEASE CONTROL

There are two major disease problems namely *Cercospora* leaf spot and rust. Maneb 30 kg/ha or Benlate (50% wp) 400 g/ha gives adequate control of leaf spot at 7-21 days intervals. Rust, *Puccinia arachidis* is difficult to control. We have not yet been able to suppress the infection.

EXPERIMENTAL RESULTS

Trials were conducted on sandy loam soils. The land was cultivated to a fine tilth using a rotavator and left flat. The experiments were hand planted with 150 kg per ha of a compound fertilizer (16:16:8) applied in furrows 4-6 inches from the seedling 4 weeks after planting. The experimental design was a complete randomized block of 4 replicates. Diphenamid 50w at the rate of 9 kg/hectare was applied with a knapsack immediately after planting.

VARIETY TRIAL

Four varieties were evaluated with each treatment having 4 rows 26 feet long. Planting was 4-6 inches in row by 18 inches between rows 1.5 to 2 inches deep.

Table 6. Result Variety Trial

Variety	In Row Spacing (cm)	Yield kg/ha	Per metre of row	
			yield (g)	Plants
Valencia	10	9763	439.42	11
Schulamit	15	5191	233.32	7
Florrunner	15	5178	232.75	7
RF 10	15	5235	235.30	7

Results were calculated from sampling one metre of row from each treatment per replicate.

SPACING TRIAL

Six spacing regimes were tried. Each treatment was approximately 8 metres long by 4 rows, spaced 45.7 cm apart. Results tabulated below were calculated from one square metre per treatment per replicate.

Table 7. Result Spacing Trial

Treatment	Seeds per rep.	Area (m^2) per rep.	Plants per m^2	Yield kg/ha
10 x 46 cm	324	11.04	33	1140
15 x 23 cm	216	5.52	35	954
10 x 41 cm	324	5.52	33	950
10 x 23 cm	324	9.84	55	1228
15 x 30 cm	216	7.20	28	827
10 x 30 cm	324	7.20	44	1190

Variety trial was planted 6th October 1977 and harvested on 16th January for Valencia and 1st February 1978 for the other three varieties. Diphenamid (9kg/ha) was used as a pre-emergence weedicide immediately after planting.

Throughout the experimental period two hand weedings were necessary to remove weeds. The dominant weed was nutgrass, *Cyperus rotundus*.

For the spacing trial Valencia variety was planted 14th September and harvested 20th December 1977. Weed control was as for the variety trial.

The results from those small experimental trials indicate not only the yield potentials of the local Valencia variety, but that as plant density increases over 330,000 plants per hectare yield progressively decreases.

Table 8. Groundnut and Groundnut Products Import into CARICOM States 1974 – 1975

Country of Origin	Antigua		Barbados		Dominica 1		Grenada 1		Guyana	
	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC
Antigua	–	–	–	–	–	–	–	–	600	4866
Barbados	–	–	–	–	–	–	–	–	15000	589
Guyana	–	–	120	417	–	–	–	–	–	–
Jamaica	–	–	7563	27980	–	–	2815	3406	60044	229272
St. Kitts	5000	6000	–	–	–	–	–	–	–	–
St. Vincent	–	–	10638	10270	–	–	–	–	127031	142852
Trinidad & Tobago	–	–	185591	408265	692	661	1110	1714	372	372887
French West Indies	–	–	–	–	762	218	–	–	–	–
France	–	–	–	–	80	16	–	–	–	–
USA	–	–	42619	47666	510	790	58	110	2	3
Canada	–	–	25430	63085	–	–	4496	1005	–	–
U.K.	–	–	16974	40242	9283	18678	8531	13076	2	6
Netherlands	–	–	–	–	–	–	698	1329	16610	18369
British East Africa	–	–	–	–	1943	1554	–	–	–	–
Ethopia	–	–	20300	16694	–	–	–	–	–	–
Kanya	–	–	–	–	–	–	–	–	104906	99127
Senegal	–	–	–	–	–	–	3740	3431	26180	22896
Zambia	–	–	–	–	–	–	–	–	7508	7940
Zanzibar	–	–	–	–	–	–	–	–	–	–
Egypt	–	–	89980	78196	–	–	935	824	42995	42634
Israel	–	–	26611	22929	–	–	–	–	–	–
India	–	–	–	–	–	–	1760	1461	382750	286388
Hong Kong	–	–	–	–	–	–	–	–	–	–
Malaysia	–	–	–	–	–	–	–	–	–	–
China	–	–	–	–	–	–	–	–	25234	28643
Brazil	–	–	–	–	–	–	3850	3112	22000	16413
Total	5000	6000	425826	715744	13270	21917	27993	38594	916240	985497

1 = Year 1974

Table 8. Cont'd

Country of Origin	Jamaica		Montserrat		St. Kitts		St. Lucia		St. Vincent		Trinidad & Tobago	
	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC	lbs	$EC
Antigua	–	–	–	–	–	–	–	–	–	–	–	–
Barbados	–	–	–	–	–	–	1500	2100	–	–	–	–
Guyane	–	–	–	–	–	–	–	–	–	–	–	–
Jamaica	–	–	–	–	–	–	398	1497	–	–	3675	12495
St. Kitts	–	–	1680	2008	–	–	–	–	–	–	–	–
St. Vincent	–	–	–	–	–	–	–	–	–	–	1100	903
Trinidad & Tobago	1840	2805	–	–	4070	5206	4670	7996	4202	5664	–	–
French West Indies	–	–	–	–	–	–	1295	523	–	–	–	–
France	–	–	–	–	–	–	–	–	–	–	–	–
USA	1397033	1043265	200	281	1586	4622	41440	36357	70	177	3672972	2776930
Canada	–	–	–	–	270	736	1744	4140	1072	1887	49200	66496
UK	2061	2645	–	–	3051	8275	27575	52049	878	1407	8910	6785
Netherlands	–	–	–	–	–	–	–	–	–	–	–	–
British East Africa	–	–	–	–	–	–	–	–	–	–	–	–
Ethopia	–	–	–	–	–	–	–	–	–	–	–	–
Kenya	–	–	–	–	–	–	–	–	–	–	–	–
Senegal	–	–	–	–	–	–	–	–	–	–	–	–
Zambia	–	–	–	–	–	–	–	–	–	–	–	–
Zanzibar	–	–	–	–	–	–	2249	1928	–	–	159586	126319
Egypt	–	–	–	–	1650	1881	10136	10523	–	–	–	–
Israel	–	–	–	–	–	–	–	–	–	–	51371	42558
India	–	–	–	–	–	–	5294	4398	–	–	253605	225902
Hong Kong	–	–	–	–	–	–	–	–	–	–	405	566
Malaysia	–	–	–	–	–	–	–	–	–	–	1839	1989
China	–	–	–	–	–	–	11201	14400	–	–	66137	57901
Brazil	–	–	–	–	–	–	–	–	–	–	–	–
Total	1400934	1048715	1880	2289	10627	20720	107502	135911	6222	9135	4268800	3318844

Source: Caribbean Community Secretariat

STRATEGIES AND TECHNOLOGIES

Total import of peanuts in the CARICOM region for 1975 was about E.C. $6.3 million (table 8). The figures also indicate that of the total weight imported 7.3% was locally produced. However, the actual CARICOM production is even less as most of the preserved peanuts and peanut products were re-export within the region from external sources.

At the present rate of consumption it is estimated that the demand for peanut in the region for the snack trade will be 15 million pounds by 1980.

In St. Kitts yields of over 1120 kg per hectare is obtained in pure stands under commercial production while with small plot experimental conditions over 9641 kg per hectare was obtained.

It is known that the average pod yield per hectare for the U.S.A is 2815 kg and that certain regions in the U.S.A. frequently surpass 3363 kg to the hectare.

Observations in St. Kitts indicate that with improved technology and adaptation of an improved package of practices, yields can be dramatically increased. The present position can be summarised thus:

1. the local Valencia is potentially a very high yielding variety with a very competitive total growth period (90-110 days).
2. there is a need for improved land preparation to obtain fine tilth to a depth of 6 inches.
3. use of an efficient seeder so that stands of 280,000 to 330,000 plants per hectare can be obtained.
4. efficient weed control measures for the first 4-8 weeks of plant growth.
5. optimum water use for quick plant growth and uniform pod maturity.
6. mechanical harvesting for inverting and combining the plants.

The results of the experiments and observations under commercial production suggest continued applied research in the areas of water use; varietal assessment; weed control (cultural and chemical); plant protection; fertilizer requirements and bacterial inoculation. However, the package of practices using the local Valencia variety can improve both yield and cost of production as high density planting decreases the incidence of weeds.

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NAME OF PAPER: Potentials and Problems of Peanut Production in St. Kitts
(K. Buckmire)
Questions by: John Hammerton
Country: Belize

QUESTIONS:

1. What is present small farmer practice in regard to:
   a. row spacing and intra row spacing.
   b. herbicides, insecticides and fungicides?

2. What are average yields of small farmers and average costs of production?

3. What additional inputs could, in your view, be made to increase yields economically?

ANSWERS:

1. Small farmers have no standard spacing practice but our extension services over the last year or so have begun to stimulate them to spacing of 3 to 6 inches in row and 18 inches between row. The normal practice is to plant 6 to 12 inches in row and 12 to 24 inches between rows. The farmers hill the plants. No herbicides, insecticides or fungicides are used by the small farmers. They do not have small sprayers and in most cases water is not available.

2. This is not known. A specific project will have to be done to as certain same. The chief constraint for not doing such work is manpower limitations.

3. Yields can be immediately increased per unit area by:
   a. planting only the local Valencia variety
   b. better preparation of lands so that precision seeding machines can give good stands
   c. using better lifting and windrowing techniques.
   For large scale production machines for inverting will increase the recovery of pods by at least 5% but in some cases up to 20% on dry lands.

Questions by: E. Soe Agnie
Country: Suriname

QUESTIONS:

1. Why a compound fertilizer with a low K_2O content is used? In my opinion potassium requirements of peanut are rather high.

2. Why there is a great difference concerning the yield per ha between the variety trial and the spacing trial? The variety used was the same (Valencia).

ANSWERS:

1. Work so far in the Caribbean indicates that response to NPK fertilizer is not apparent. Since there is a symbiotic nitrogen supply and phosphate fixation it is recommended that soil fertility can be maintained by the suggested amounts. Let we hasten to add that more fertilizer work is planned for 1979.

2. This we cannot explain. However the experiment (spacing) was just repeated and this may throw some light on the results.