



GUYANA

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OF THE

Ministry of Agriculture

& Natural Resources

(Agriculture & Land Development Departments)

FOR THE YEAR

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GUYANA

ANNUAL REPORT
OF THE
MINISTRY OF AGRICULTURE
AND
NATURAL RESOURCES

23

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Introduction

The overall purpose of this report as in previous years is to describe the agricultural situation in the country, and to outline the work which is being done in the various divisions of the Department of Agriculture. The work of each division is summarised in a separate chapter. A more detailed report of the Research Division is available to interested readers, on request.

In many respects, the year 1968 was a very eventful one for the Ministry. With the closure of the Manganese Mines in the North West District, a major effort was made to provide alternative employment to the six hundred and forty (640) families who were deprived of regular employment.

During the year, there was a great improvement in the overall staffing situation. Vigorous recruitment efforts over the past few years started to be reflected on the stream of qualified personnel joining the Department.

The most unfortunate news to report is the death of Mr. A V. Wan Ping, Chief Agricultural Officer, who died on 14th September, 1968 after a short illness. Mr. Wan Ping will be long remembered for the leading role he played in the Hybrid Corn Programme. It was Mr. Wan Ping who introduced the high yielding varieties from Jamaica to set the programme in motion. Mr. Wan Ping was borne to his grave by senior members of the staff of the Ministry.

Agricultural Objectives and Policies:-

New agricultural policies and objectives for the Department were approved. These are as follows:-

Agricultural objectives

- (i) to increase the present level of the rate of growth of agricultural output in order to maintain the national rate of growth of 6 percent per annum;
- (ii) to increase the export of agricultural products;
- (iii) to raise agricultural output especially with regard to rice, coconuts, corn, beef, pigs, dairy, poultry, fishery, honey, and beeswax;
- (iv) to diversify agricultural output;
- (v) to reduce the costs of production and to increase efficiency;
- (vi) to provide new opportunities for employment;
- (vii) to improve the standard of living of the rural population;
- (viii) to establish a basis for industry based on agriculture

The policies to obtain these objectives have been formalised and are grouped in 4 main categories - viz production policies, efficiency policies, production incentive policies and institutional reform policies.

Production policies

The production policies are as follows:

- (i) Providing improved seeds, and other forms of planting material, fertilisers, insecticides etc. at reasonable prices and encouraging their efficient usage.
- (ii) Opening up new lands which are suited for agricultural utilisation on the coastal belt, the riverain and selected interior areas, in order to secure their beneficial occupation, and thereby provide new employment opportunities.
- (iii) Enlarging research and improving husbandry practices among the major agricultural pursuits.
- (iv) Diversifying crop production by introducing new crops, both for domestic consumption and the export market.
- (v) Encouraging animal and fish production, more especially the production of beef, pork, poultry and dairy products, with the view of satisfying all domestic needs while providing surpluses for export.

Efficiency policies

- (i) Strengthening the agricultural extension and education services to embrace a larger clientele and to provide a wider range of educational programme.
- (ii) Strengthening agricultural education and training programme to keep all officers up to date, and to provide the agricultural sector with an adequate number of trained personnel.
- (iii) Improving agricultural extension, research and training to make these serve the agricultural sector more meaningfully.
- (iv) Ensuring the fullest possible Utilisation of all human resources within the Department, and the agricultural sector in general.
- (v) Making more efficient, the co-ordination between the various divisions within the Department of agriculture, as well as the outside agencies working in the agricultural sector.
- (vi) Decreasing the cost of production by using improved techniques in crop and animal production and creating a business oriented attitude among farmers.
- (vii) Improving drainage and irrigation facilities and practices on all types of farms to make water utilisation more efficient.
- (viii) Improving soil utilisation practices to reduce to the minimum soil erosion and to increase soil productivity.

Production incentive policies

- (i) Providing for the farmer a reasonable rate of return from his holding.
- (ii) Providing assured markets for agricultural products.
- (iii) Stabilising the prices of farm products, always bearing in mind the effect on the existing cost of living, and the needs of the farming community.
- (iv) Providing adequate protection measures against pests and diseases for both crops and livestock and ensuring security measures.
- (v) Working out a suitable system of crop insurance.
- (vi) Making credit more readily available at reasonable rates of interest.

Institutional reform policies

- (i) Providing a comprehensive holding act to give farmers full security of tenure on the land.
- (ii) Establishing an agricultural credit institution to supply farmers with supervised agricultural credit.
- (iii) Providing the necessary assistance in strengthening the marketing agencies and marketing channel operations.
- (iv) Encouraging agricultural cooperative associations which can serve as media for increased self-help measures the securing of agricultural services for the members.
- (v) Improving the structure and coordination of agricultural agencies to make them perform more efficiently, to ensure greater benefit to farmers and the agricultural sector as a whole.

THE PLANNING AND PROGRAMMING DIVISION

FUNCTIONS:

The functions of the division are:-

1. Collecting, processing, collating and presenting Agricultural Statistics for use in Government Departments and to satisfy local and international requests;
2. Forecasting and estimating production of agricultural produce;
3. Assessing the economic feasibility of Government Projects in agricultural development;
4. Market research and marketing intelligence information;
5. Economics of Farm Management and Agricultural Credit advisory service;
6. Project preparation;
7. Any other problems in the Agricultural Sector which may need the advice of the Senior Agricultural Economist.

AGRICULTURAL CENSUS:

The responsibility for undertaking the 1968 Census of Agriculture rests with the Statistical Bureau of the Ministry of Economic Development. Field work began around August, and the processing of information collected has already started. Although it is too early to predict the time when information will be released, it is reasonably certain that before the end of 1969 results will be available.

The census, in addition to providing a bench-mark for comparison with current data, should also provide the basis for designing and selecting samples of agricultural holdings, from which data can be collected for such important annual series as employment in agriculture, area cultivated, crop yields, livestock production, farm sales and farm household consumption etc.

SURVEYS AND REPORTS:

Rice Estimate Survey: For the Spring and Autumn rice crops, schedules were prepared and Field Assistants, as well as farmers, were asked to provide information on acreage and yield.

At the time of harvesting, periodical checks were made on individual farms in the reaping areas by members of the Planning and Programming Division.

A Special Survey, on a scientific basis, was undertaken by the Division to provide information on a Forecast of Production for the 1968 Autumn Rice Crop. A report was prepared and forwarded to the Chief Agricultural Officer.

Expansion of Livestock Production: A report on the expansion of Livestock Production No. III - Pork and Pork Products was prepared by the Agricultural

Economist. Among the topics discussed were:-

- (1) Local market and imports;
 - (2) Local expertise and facilities for production;
 - (3) Supplying of breeding stocks;
 - (4) Credit needs;
- and (5) Interest charges, loan administration and repayments.

F.A.O. Reports: A report on Agricultural Price Stabilization and support policies was prepared and submitted to F.A.O. The main subjects discussed were:-

- (1) Measures based on Trade regulations and organisation of marketing;
 - (2) Support policies;
 - (3) Other non-price support measures;
- and (4) Structural Reform.

Two questionnaires, one dealing with production and trade in agricultural commodities and the other on imports, production, consumption and prices of fertilisers were prepared and dispatched to F.A.O., Rome.

Reports on the Economic aspects of rice and quarterly rice situation were also completed and forwarded to F.A.O.

The Senior Economist prepared a report on the Agricultural Marketing Protocol Conference which he attended and which was held in St. Lucia on the 29th and 30th of October, 1968.

The Agricultural Economist prepared papers on "Aspects of Drainage and Irrigation in Guyana", and "The Expansion of Beef Production" for the Aid Donors' Conference held in Guyana in September, 1968. A paper entitled, "Socio Economic Factors Affecting Agricultural Production in the West Indies" was presented to the Caribbean Nutrition Conference which was held in Georgetown, Guyana, on the 29th July, 1968.

Market Surveys: Three days each week, surveys of the three municipal markets were carried out to obtain data on (1) Farmers' Prices (2) Retail Prices and (3) Supplies at the municipal markets.

Data on agricultural commodities imported, and which are economically feasible to be produced in Guyana, was tabulated and presented for official use.

GENERAL CONDITIONS OF PRODUCTION AND TRADE IN AGRICULTURE

(a) Major Factors Affecting Agricultural Production:

Weather: The main factor influencing production was rainfall. This was heavy during the May-June period and reduced rice production considerably. The other crops and livestock were not as severely affected. Weather statistics are dealt with more fully in Chapter VII.

Prices and Marketing Service: The Guyana Marketing Corporation continued to offer guaranteed prices for some specific agricultural commodities. In many instances, a scarcity price, which is much higher than the minimum guaranteed price was paid to

farmers. Farmers are inhibited in their production efforts partly because the prices are not remunerative or because of poor marketing arrangements. With the introduction of the contractual arrangements, it is hoped that there would be greater efficiency in the marketing system.

- (iii) Predial Larceny: There is no conclusive statistical evidence to show whether predial larceny is on the increase. However, from partial investigation, predial larceny does have an effect in limiting the cultivation of certain crops and livestock. Coconuts and livestock are mostly affected by predial larceny while sugar-cane and rice lend themselves less to larceny.
- (iv) Use of Fertilisers: Except for sugar, and to a limited extent rice, the application of fertilisers to increase production can be considered negligible.

Table I shows the imports of fertilisers for the period 1964 to 1967.

Table I
Quantities of Fertilisers Imported, 1964-1967

YEAR	TYPES IMPORTED (TONS)				Total
	Nitrogenous	Phosphatic	Potassic	Others	
1964	18,608	2,635	2,005	907	24,155
1965	23,204	3,309	1,237	532	28,282
1966	24,676	2,655	2,025	1,110	30,466
1967	30,256	2,706	2,774	747	36,483

While there were some fluctuations in the imports of phosphatic and potassic fertilisers, the imports of nitrogenous fertilisers over the period show a steady rise from 18,608 tons in 1964 to 30,256 tons in 1967 and, also, nitrogenous fertilisers were the most popular type imported and accounted for 77%, 82% and 83% of the total quantities imported for the years, 1964, 1965, 1966 and 1967.

In comparison with 1967, the 1968 figures show a 3.1% decrease in fertilisers used on Sugar Estates and a rise of 18.5% of the quantities used by small farmers. The total quantities used in the sugar industry are shown in table 2.

Table 2
Quantities of Fertilisers used in the Sugar Industry,
1967 and 1968

T Y P E S	1 9 6 7				1 9 6 8			
	Sugar Estates	Farmers	Total (tons)	% of Total	Sugar Estates	Farmers	Total (tons)	% of Total
Nitrogenous	25,360	1,605	26,965	82.9	23,194	1,832	25,026	78.4
Phosphatic	2,795	143	2,938	9.0	2,728	314	3,042	9.5
Potassic	2,304	197	2,501	7.7	3,437	157	3,594	11.3
Others (incl. mixed)	89	26	115	0.4	239	32	271	.8
Total:	30,548	1,971	32,519	100.0	29,598	2,335	31,933	100.0

Crops - Production and Trade:Sugar and By-Products:

Sugar production in 1968 fell short of the anticipated target of 335,000 tons by 18,152 tons or 5.4% and by 27,074 tons from the 1967 record production of 343,922 tons. The fall in production was due mainly to stoppages of work during the autumn crop.

All eleven factories operated during the year and processed 3,501,504 tons sugar-cane compared with 3,770,115 tons in 1967 and 3,335,267 tons in 1966.

Cultivation of sugar-cane is mainly on a plantation basis, but there is a growing section of small farmers. The plantations are owned by two Sugar Companies, Bookers' Estates Ltd. and the Demerara Company Ltd., of which Bookers' Estates operate nine factories and Demerara Company two. These companies, in their effort to effect the highest possible standard of technical and economic efficiency, maintain their own staff of highly qualified scientists, technicians and other personnels.

In 1968, Estates produced 295,335 tons of Sugar or 93.2% of the country's production and farmers 21,513 tons or 6.8%, in comparison with 322,206 tons produced by estates in 1967 or 93.7% and 21,716 tons by farmers or 6.3%.

The country's average yield of sugar per acre showed a slight drop of .03 tons per acre; 2.95 tons in 1968 as against 2.98 tons in 1967.

The average yield of sugar per acre on the sugar estates was 2.96 tons, .04 tons less than the previous year, while farmers yield moved up slightly from 2.77 tons in 1967 to 2.86 tons in 1968. The average yield of cane per acre on estates was 32.7 tons compared with 32.8 tons in 1967; while farmers' yield was 31.6 tons in 1968 and 31.0 in 1967.

The tons canes to tons sugar ratio on estates was around the same as that for farmers i.e. 11.0 tons cane to 1 ton sugar.

Of the 107,450 acres reaped 63,821 acres or 59.4% were in Demerara, the remaining 43,629 acres were from Berbice. A quantity of 176,126 tons sugar or 55.6% of the country's production was obtained in Demerara as compared with 140,722 tons or 44.4% in Berbice.

Table 3 shows acreage reaped, production and yield per acre by counties for 1962 to 1968.

Table 4 shows acreage reaped, cane harvested and sugar manufactured on estates; while table 5 gives acreage reaped, cane harvested and sugar produced by farmers.

Table 3

Acreage Reaped, Production of Sugar and Yield per Acre
by Counties, 1962 - 1968

YEAR	Area Reaped (including farmers' canes) English Acres			Sugar Produced (including farmers' canes) Tons			Yield per Acre Tons		
	Berbice	Demerara	Country	Berbice	Demerara	Country	Berbice	Demerara	Country
1962	38,632	61,702	100,334	125,065	200,958	326,023	3.24	3.26	3.25
1963	37,666	59,485	97,151	120,980	196,157	317,137	3.21	3.30	3.26
1964	39,020	56,163	95,183	108,149	150,229	258,378	2.77	2.67	2.71
1965	39,029	68,075	107,104	125,225	184,220	309,445	3.20	2.71	2.89
1966	40,185	63,587	103,772	117,905	170,964	288,869	2.93	2.69	2.78
1967	44,545	70,753	115,298	148,239	195,683	343,922	3.33	2.77	2.98
1968	43,629	63,821	107,450	140,722	176,126	316,848	3.23	2.76	2.95

Table 4

Estates: Acreage Reaped, Cane Harvested and Sugar
Manufactured, 1965 - 1968

YEAR	Acreage Reaped (Eng. Acs.)	Cane Harvested (tons)	Sugar Manu- factured (Tons)	Yield Cane Per Ac. (Tons)	Yield Sugar Per Ac. (Tons)
1965	101,636	3,249,571	295,413	32.0	2.91
1966	97,606	3,136,384	273,831	32.1	2.81
1967	107,460	3,527,417	322,206	32.8	3.00
1968	99,916	3,263,800	295,335	32.7	2.96

Table 5

Farmers: Acreage Reaped, Cane Harvested, Sugar
Produced, 1965 - 1968

YEAR	Acreage Reaped (Eng. Acs.)	% of Country	Cane Harvested (Tons)	% of Country	Sugar Produced (Tons)	% of Country	Tons Canes to Ton Sugar	Tons Cane per Acre	Tons Sugar per Acre
1965	5,468	5.1	155,384	4.6	14,032	4.5	11.1	28.4	2.57
1966	6,166	5.9	198,883	6.0	15,038	5.2	13.2	32.3	2.44
1967	7,838	6.8	242,698	6.4	21,716	6.3	11.2	31.0	2.77
1968	7,534	7.0	237,704	6.8	21,513	6.8	11.0	31.6	2.86

Table 6 shows the quantity of fertilisers and limestone used on Sugar Estates for the past 4 years and table 7, the amount used by farmers.

Rum: 3,276,499 gallons rum were produced in 1968; 129,140 gallons less than in 1967. However, local sales of rum in 1968 was higher by 24,564 gallons - 532,830 gallons in 1968 compared with 508,266 gallons in 1967. Table 8 shows rum production by counties for the years 1962 to 1968.

Table 8
Rum Production by Counties, 1962 - 1968

YEAR	Demerara (pf. gals.)	Berbice (pf. gals)	Total Country (pf. gals)
1962	2,276,434	471,933	2,748,367
1963	2,088,874	449,724	2,538,598
1964	2,649,407	409,996	3,059,403
1965	3,206,515	436,880	3,643,395
1966	2,521,412	360,016	2,881,428
1967	3,070,027	335,612	3,405,639
1968	3,127,935	148,564	3,276,499

Molasses: A quantity of 20,079,753 gallons of molasses was produced in 1968 in comparison with 20,544,619 gallons in 1967. Table 9 gives the production for 1962 to 1968.

Table 9
Production of Molasses, 1962 - 1968

YEAR	Production (gals.)
1962	.... 18,941,231
1963	.... 18,593,148
1964	.... 18,277,190
1965	.... 18,969,368
1966	.... 20,072,416
1967	.... 20,544,619
1968	.... 20,079,753

Trade - Sugar and By-Products:

Export of sugar is handled by the Guyana Sugar Producers' Association while local distribution is done through the normal commercial system.

The Commonwealth Sugar Agreement, due to run until December 31, 1974, is now to be in operation for an indefinite period.

Table 6

Fertilisers and Limestone Used on Sugar Estates, 1965 - 1968

TYPES OF FERTILISERS	1965			1966			1967			1968		
	Quantity (Tons)	% of Total	Value \$	Quantity (Tons)	% of Total	Value \$	Quantity (Tons)	% of Total	Value \$	Quantity (Tons)	% of Total	Value \$
<u>NITROGENOUS</u>												
Sulphate of Ammonia	25,423	53.2	2,631,270	21,474	64.4	2,265,606	23,779	53.8	1,964,519	21,285	43.3	1,732,659
Urea	969	2.0	188,761	588	1.8	105,981	1,546	3.5	272,096	1,906	3.9	355,660
Diammonium Phosphate	-	-	-	-	-	-	35	0.1	7,029	3	-	516
<u>PHOSPHATIC</u>												
Super Phosphates	1,699	3.5	311,068	1,194	3.6	170,179	1,167	2.6	178,961	1,291	2.6	242,327
Hyperphosphate	1,578	3.3	115,833	1,813	5.4	128,088	1,628	3.7	120,747	1,437	2.9	124,329
<u>POTASSIC</u>												
Muriate of Potash	2,033	4.3	228,652	2,385	7.1	252,455	2,304	5.2	245,455	3,437	7.0	390,286
<u>MIXED</u>												
Compound	-	-	-	-	-	-	84	0.2	13,059	-	-	-
15-15-15	-	-	-	-	-	-	-	-	-	45	0.1	7,284
Nitro Phoska	-	-	-	-	-	-	5	-	843	194	0.4	25,604
Others	-	-	-	119	0.4	18,514	-	-	-	-	-	-
<u>LIMESTONE AND SHELL</u>												
Ground	10,049	21.0	209,878	5,766	17.3	116,722	8,512	19.2	236,564	14,699	29.9	448,094
Shell (Marine)	6,058	12.7	90,825	-	-	-	5,160*	11.7	61,920	4,561	9.3	72,976
Shell Lime	-	-	-	-	-	-	-	-	-	278	0.6	7,334
TOTAL	47,809	100.0	3,776,287	33,339	100.0	3,057,545	44,220	100.0	3,101,193	49,136	100.0	3,407,068

* Previously this was included under ground limestone.

Table 7

Fertilisers and Limestone Sold to Cane Farmers, 1965 - 1968

TYPES OF FERTILISERS	1965		1966		1967		1968	
	Quantity (Tons)	% of Total	Quantity (Tons)	% of Total	Quantity (Tons)	% of Total	Quantity (Tons)	% of Total
<u>NITROGENOUS</u>								
Sulphate of Ammonia	836	84.6	793	75.9	1,605	72.8	1,832	58.4
<u>PHOSPHATIC</u>								
Super Phosphates	7	0.7	20	1.9	89	4.0	152	4.9
Hyper Phosphate	10	1.0	14	1.4	54	2.4	162	5.2
<u>POTASSIC</u>								
Muriate of Potash	16	1.6	62	5.9	197	8.9	157	5.0
<u>MIXED</u>								
Compound	30	3.1	-	-	25	1.1	-	-
15-15-15	-	-	-	-	-	-	10	.3
Nitro Phoska	-	-	-	-	1	.1	22	.7
<u>LIMESTONE</u>								
Ground	89	9.0	156	14.9	235	10.7	763	24.3
Shell Marine	-	-	-	-	-	-	39	1.2
TOTAL	988	100.0	1,045	100.0	2,206	100.0	3,137	100.0

The negotiated price for 1969-71 remains the same at £43.10s. (\$208.80) per ton, with additional payments for the less developed countries of a fixed amount of £1.10s. (\$7.20) per ton and a variable amount in inverse ratio of £2.10s. (\$12.00) per ton.

There is a very good possibility that for 1969 the negotiated price for the West Indies and Guyana will be £47.10s. per ton.

Under the Commonwealth Agreement, the West Indies and Guyana sells some 725,000 tons of sugar a year to Britain out of total exports of about one million tons.

In 1968, Guyana sold 188,715 tons sugar or 62.5% of the total exports of 301,739 tons (provisional) at the negotiated price of £47.10s per ton f.o.b. Comparable figures for 1967 were 187,311 tons or 63.9% of the total exports of 293,313 tons.

Table 10 gives sugar exports by countries of destination for the period 1962 - 1968 (Jan.-Mar.).

Table 10
Exports of Sugar by Countries of Destination, 1962 - 1968

YEAR	UNITED KINGDOM		CANADA		U.S.A.		TOTAL	
	Quantity (Tons)	Value \$ (f.o.b.)	Quantity (Tons)	Value \$ (f.o.b.)	Quantity (Tons)	Value \$ (f.o.b.)	Quantity (Tons)	Value \$ (f.o.b.)
1962	134,475	29,234,484	111,908	16,159,297	66,124	13,899,844	312,510	59,294,304
1963	143,127	31,601,633	94,053	32,889,394	36,158	9,065,821	273,338	73,556,848
1964	91,046	20,919,592	106,752	26,111,210	36,852	6,833,893	234,650	53,864,695
1965	132,302	28,429,311	103,536	11,026,463	30,766	3,893,369	266,604	43,349,143
1966	129,342	28,040,639	95,982	9,437,859	53,817	9,015,307	279,141	46,493,805
1967	161,762	35,389,598	76,923	7,127,776	54,628	12,052,343	293,313	54,569,717
1968* (Jan.- March)	18,900	4,237,724	14,445	1,322,045	-	-	33,345	5,559,769

* The total exports for the year was 301,739 tons (provisional). Information not available by countries of destination, except as shown above.

SOURCE: Annual Account Relating to External Trade (1962 & 1964).

Statistical Bureau, Ministry of Economic Development (1963, '65, '66, '67 and '68).

1962 total includes 3 tons valued \$679. shipped to Montserrat.

The greater proportion of rum and molasses produced is also exported. Table 30 gives exports of these commodities.

Local Consumption and Prices: While it is true that the greater part of local consumption comprises local sugar, small quantities of refined sugar are also imported.

Table 11 sets out the local sales of sugar by types; Table 12 shows the fixed maximum selling prices and table 13 gives imports of refined sugar.

Table 11
Sugar Sold Locally, by Types, 1962 - 1968

YEAR	D.C. Sugar (Tons)	Y.C. Sugar (Tons)	White Sugar (Tons)	Total (Tons)
1962	18,082	5	3,101	21,188
1963	18,882	19	2,686	21,587
1964	19,624	213	2,839	22,676
1965	19,455	61	3,461	22,977
1966	19,900	90	3,821	23,811
1967	20,210	34	3,829	24,083
1968	20,745	77	4,161	24,983

Table 12
Fixed Maximum Selling Prices for Sugar, 1968

T Y P E S	Producers' Price Per Ton	Wholesalers Price Per Ton	Retail Price Per lb.
Dark Crystal	\$126.26	\$129.92	6.5¢
Yellow Crystal	151.20	154.56	7.5¢
White Crystal	192.64	196.00	9.5¢

Table 13
Imports of Icing and Refined Sugar,
1963 - 1968 (Jan. - May)

YEAR	ICING SUGAR			OTHER REFINED SUGAR		
	Quantity lbs.	Value \$	Av. Price ¢	Quantity lbs.	Value \$	Av. Price ¢
1963	67,200	20,810	31.0	26,166	6,188	23.6
1964	149,615	42,929	28.7	807,088	69,754	8.6
1965	93,380	19,607	21.0	68,088	11,631	17.1
1966	120,292	23,933	19.9	32,190	5,188	16.1
1967	143,969	26,610	18.5	58,682	9,953	17.0
1968 (Jan.-May)	77,616	16,580	21.4	16,084	3,174	19.7

SOURCE: Statistical Bureau, Ministry of Economic Development.

Rice: Rice is still the dominant crop on the flat coastal lands and is the second most important economic crop after sugar. The crop is grown on farms of varying sizes, ranging from half acre cultivated on a part-time basis to large mechanised holdings of over 1,000 acres. On certain land settlement schemes, however, where rice is considered a suitable crop, the policy is to allot to settlers for rice cultivation plots of 15 acres each. The Rice Development Company remains the largest single cultivator with an area of 2,600 acres.

Rice production for 1968 totalled 136,690 tons, an increase of 9,775 tons or 7.7% over the 1967 production of 126,915 tons.

The increase in production was due mainly to a very good spring crop which produced 46,973 tons rice. The 1968 autumn rice crop was disappointing and produced 89,717 tons rice; 5,737 tons lower than the 1967 autumn crop.

The poor performance of the 1968 autumn crop could be attributed to the following factors:-

1. Heavy rainfall during the period when land preparation was in progress;
2. Unfavourable weather at time of sowing and reaping;
3. The maximum acreage was not cultivated;
4. Destruction by pests and birds;
5. Unavailability of tractors at appropriate time of ploughing and combine harvesters at time of reaping;
6. No significant increase in the use of fertilisers to compensate for the fall in soil fertility.

and 7. Destruction of seedling by wild ducks.

The country's annual average yield per acre in 1968 was 10.7 bags paddy (140 lbs.) in comparison with 12.3 bags per acre in 1967 and 12.7 bags per acre in 1966. The reduced yield per acre in 1968 was as a result of the poor autumn crop.

Table 14 below shows rice acreage and yield for the spring and autumn crops from 1960 - 1968.

Table 14

Rice Acreage and Yields, Spring and Autumn Crops, 1960-1968

YEAR	SPRING CROP		AUTUMN CROP		T O T A L	
	Acreage Harvested (Eng. acres)	Yield (Tons Rice)	Acreage Harvested (Eng. acres)	Yield (Tons Rice)	Acreage Harvested (Eng. acres)	Yield (Tons Rice)
1960	24,932	10,573	195,275	115,560	220,207	126,133
1961	35,045	12,425	226,304	111,598	261,349	124,023
1962	35,973	15,424	210,000	114,500	245,973	129,924
1963	35,000	16,000	166,145	86,884	201,145	102,884
1964	32,933	9,735	278,484	146,191	311,417	155,926
1965	88,271	30,674	248,960	134,228	337,231	164,902
1966	45,472	11,808	262,923	147,600	308,395	159,408
1967	76,318	31,461	177,181	95,454	253,499	126,915
1968	111,465	46,973	201,670	89,717	313,135	136,690

Table 15 gives the acreage and production of rice according to counties:-

Table 15
Distribution of Acreage and Yield According to
Counties, 1960 - 1968

YEAR	ACREAGE (ENG. ACRES)				YIELD (TONS RICE)			
	Berbice	Demerara	Essequibo	Total	Berbice	Demerara	Essequibo	Total
1960	90,210	89,832	40,165	220,207	55,630	44,777	25,726	126,133
1961	120,740	95,250	45,359	261,349	57,463	42,826	23,734	124,023
1962	97,317	101,133	47,523	245,973	55,209	48,373	26,342	129,924
1963	88,751	72,961	39,433	201,145	46,395	32,702	23,787	102,884
1964	156,070	108,594	46,753	311,417	71,896	56,174	27,856	155,926
1965	146,914	108,365	81,952	337,231	70,373	47,333	47,196	164,902
1966	140,384	104,177	63,834	308,395	66,131	60,352	32,925	159,408
1967	113,778	66,918	72,803	253,499	47,387	40,006	39,522	126,915
1968	148,218	93,146	71,771	313,135	56,241	44,827	35,622	136,690

The increasing use of tractors for ploughing and other purposes has almost eliminated the traditional oxen in most parts of the country. The use of combine harvesters also has been increasing and very shortly harvesting will be completely mechanised.

Table 16 gives a yearly estimate of tractors operating in the rice industry from 1965 to 1968.

Table 16
Estimated Number of Tractors in Operation in the
Rice Industry, 1965 - 1968

<u>Year</u>	<u>No. of Tractors</u>
1965	3,414
1966	3,450
1967	3,611
1968	3,625

In 1968, an estimated 200 tractors were registered to be used for rice cultivation.

Combines are sometimes purchased co-operatively or by individuals who use the machines to harvest their crops and undertake a certain amount of custom work.

Table 17 gives an annual estimate of the number of combines operating in the rice industry from 1965 to 1968.

Table 17

Estimate of Combine Harvesters Operating in the
Rice Industry, 1965-1968

<u>Year</u>		<u>No. of Combines</u>
1965	.....	310
1966	.....	341
1967	.....	371
1968	.....	380

In 1968, 9 combine harvesters were sold by importing agents in comparison with 30 the previous year.

Milling facilities are fast improving and of the 211 existing mills, 76 are multi-staged. Two multi-staged mills owned by the Rice Development Company are considered the largest in the country and together they are capable of processing 25,000 tons of paddy annually.

The increase in the number of multi-staged mills has been responsible for some of the better quality of rice produced and has led also to an increase in the quantity of by-products available for stock feed.

Table 18 gives the distribution of rice mills by types and by counties for the period 1964 to 1968.

Table 18

No. of Rice Mills in Operation, 1964 - 1968
by Counties

<u>Type of Mills</u>	<u>Berbice</u>	<u>Demerara</u>	<u>Essequibo</u>	<u>Total</u>
<u>1964</u>				
Single Stage	60	55	36	151
Multi Stage	23	18	20	61
Total:	83	73	56	212
<u>1965</u>				
Single Stage	58	52	30	140
Multi Stage	23	18	20	61
Total:	81	70	50	201
<u>1966</u>				
Single Stage	62	59	33	154
Multi Stage	23	19	20	62
Total:	85	78	53	216
<u>1967</u>				
Single Stage	61	57	37	155
Multi Stage	25	21	20	66
Total:	86	78	57	221
<u>1968</u>				
Single Stage	55	51	29	135
Multi Stage	28	23	25	76
Total	83	74	54	211

The Guyana Rice Development Company continued to provide service to farmers, purchasing paddy at its milling centres at Anna Regina and at Burma, Mahaicony. No purchasing or production by the company was carried out during 1968 at Black Bush Polder. Total purchases for the year ending 31st December, 1968, amounted to 605,646 bags.

The paddy produced at the company's cultivation at the Mahaicony-Abary Scheme amounted to 44,837 bags.

Details of purchases are shown in table 19.

Table 19

Purchases of Paddy by Guyana Rice Development Co. Ltd.,
1964 - 1968

S O U R C E	Bags 140 lbs. Nett.				
	1964	1965	1966	1967	1968
<u>Mahaicony - Abary</u>					
(a) Company Production	48,138	37,387	27,571	45,164	44,837
(b) Farmers' Cultivation	450,629	340,275	408,119	334,199	269,832
<u>Black Bush Polder</u>					
(a) Company Production	-	7,664	-	-	-
(b) Farmers' Cultivation	-	1,251	-	-	-
<u>Anna Regina</u>					
Farmers' Production	342,468	419,521	278,043	366,776	290,977
Total	841,235	806,098	713,733	705,489	605,646

The government continued in 1968 to offer the following aids in order to increase rice production:-

The Ministry of Agriculture and Natural Resources offered technical advice to farmers through the extension service; produced pure line seed paddy for sale and carried out research in the propagation of new varieties of paddy.

The Guyana Rice Marketing Board continued in 1968 to provide funds to assist in the Control Measures of disease and pests. The activities were carried out under the supervision of the Ministry of Agriculture and Natural Resources. In addition, spraying equipment and pumps were sold to farmers on credit.

Credit was also provided to help farmers to obtain essential requirements for the successful establishment of the Blue belle variety of paddy.

The government sponsored Credit Corporation continued to offer loans to farmers for purchasing of tractors and combine harvesters and for the development of land for rice cultivation, at interest rates much below that of other lending institutions in the country.

"The Securities of Tenure Ordinance" was in force during the year. This ordinance assures equity between landlord and tenant in the renting of rice lands.

Rice-Trade: All rice produced in the country with the exception of that required by producers to meet their personal needs, must be sold to the Guyana Rice Marketing Board. The Board, organised since 1939, is responsible for

grading, blending, packaging and bagging, both for local distribution and exports.

General commercial policy aims at meeting the full requirements of the West Indian markets and, if possible, other markets at reasonably remunerative market prices.

Table 20 shows exports of rice by countries of destination.

The following table sets out the 1967 local sales of rice, by grades.

Table 21
Local Sales of Rice by Grades, 1967 & 1968

GRADES	LOCAL SALES (TONS)		% OF TOTAL SALES	
	1967	1968	1967	1968
Brown "A"	7,243.4	7,892.2	69.4	76.9
Brown "B"	1,381.7	579.9	13.3	5.6
White "A"	212.5	185.3	2.0	1.8
White "B"	386.1	355.3	3.7	3.5
Super	12.6	147.0	0.1	1.4
Packaged	847.4	705.9	8.1	6.9
Brewers' Broken	15.9	55.3	0.2	0.5
Mixed Broken	24.0	136.3	0.2	1.3
Stockfeed	307.7	211.7	3.0	2.1
Total	10,431.3	10,268.9	100.0	100.0

Table 22 shows prices paid by the Guyana Rice Marketing Board for par-boiled rice during 1968:

Table 22
Prices Paid by the Guyana Rice Marketing Board
for Milled Parboiled Rice, 1968

GRADES	Price per Bag of 180 lbs. Gross (Georgetown Pond)
Super	20.00
No. 1	17.00
No. 2	13.80
No. 3	10.00
Broken	7.20
Unclassified	4.30

Table 23 gives prices paid by the Rice Marketing Board for milled white rice.

Table 23
Prices paid by the Guyana Rice Marketing
Board for Milled White Rice, 1968

GRADES	Price per Bag of 180 lbs. Gross (Georgetown Ponds) 1968
White "A"	\$19.00
White "B"	\$17.00
White "C"	\$14.00
White Broken	\$ 7.20

Table 20

EXPORTS OF RICE BY COUNTRIES

OF I

COUNTRIES OF DESTINATION	1 9 6 4			1 9 6 5			1 9	
	Quantity L. Tons	% of Total	Value G\$.	Quantity L. Tons	% of Total	Value G\$.	Quantity L. Tons	% of Total
Antigua	1,435	1.8	446,896	1,503	1.5	469,849	1,337	1.1
Barbados	7,275	9.0	1,936,424	7,849	7.9	2,096,726	7,931	7.1
Dominica	534	.7	142,483	385	.4	103,778	543	.5
Grenada	1,355	1.7	359,216	1,073	1.1	285,846	1,406	1.3
Jamaica	15,562	19.3	4,200,147	11,905	12.0	3,233,410	10,083	10.0
Montserrat	137	.2	42,570	153	.1	47,581	117	.1
St. Kitts	1,124	1.4	303,407	1,186	1.2	318,438	1,210	1.1
St. Lucia	849	1.0	230,583	532	.5	147,548	819	.8
St. Vincent	1,172	1.4	307,321	1,135	1.1	297,630	1,321	1.2
Trinidad	29,871	37.1	8,035,064	31,139	31.4	8,424,446	28,778	28.0
Guadeloupe	-	-	-	2,765	2.8	595,196	4,302	4.3
Martinique	419	.5	109,115	1,270	1.3	289,476	1,448	1.4
St. Barthelemy	2	-	674	1	-	225	1	-
Cuba	18,349	22.8	5,447,789	3,439	3.5	1,007,987	-	-
Cayenne	-	-	-	-	-	-	56	.1
West Africa	-	-	-	6,678	6.7	973,749	23,084	22.9
Liberia	-	-	-	-	-	-	9,955	9.9
Singapore	-	-	-	-	-	-	-	-
Hong Kong	-	-	-	-	-	-	-	-
United Kingdom	160	.2	42,804	1,009	1.0	138,057	-	-
Canada	328	.4	124,780	8	-	2,485	-	-
Rotterdam	-	-	-	-	-	-	620	.6
Antwerp	-	-	-	3,859	3.9	440,592	506	.5
Bremen	-	-	-	351	.4	31,575	1,792	1.8
India	-	-	-	-	-	-	4,920	4.9
Nickerie, Surinam	-	-	-	-	-	-	193	.2
South Vietnam	-	-	-	-	-	-	216	.2
Hamburg	2,000	2.5	470,481	7,395	7.5	1,451,714	-	-
Abidjan	-	-	-	12,411	12.5	2,255,246	-	-
Puerto Rico	-	-	-	426	.4	81,657	-	-
Bahamas	-	-	-	25	-	6,510	-	-
Portuguese Guinea	-	-	-	2,136	2.2	185,863	-	-
Nigeria	-	-	-	80	.1	14,495	-	-
Dunkirk	-	-	-	498	.5	45,885	-	-
Madeira	-	-	-	20	-	4,042	-	-
Total	80,572	100.0	22,199,754	99,231	100.0	22,950,006	100,638	100.0

SOURCE: Guyana Rice Marketing Board

The following table shows the wholesale price for rice:-

Table 24

Wholesale Prices of Rice, by Grades, Effective
from 1st October, 1968

GRADES	Price per Bag of 180 lbs. (Gross)
Super	23.95
Brown "A"	19.70
Brown "B"	14.45
White "A"	22.20
White "B"	19.70
Brewer's Broken	12.90
Mixed Broken	11.35
Stockfeed	8.10
"Pearl Brand"	10.60 per carton of 60 lbs. net weight; minimum sale quantity - 3 cartons.
"Indian Maid"	8.23 per paper sack of 50 lbs. net weight, mini- mum sale quantity - 4 sacks.

Table 25 gives local retail prices of rice as from the 10th October, 1968.

Table 25

Retail Price For Rice

GRADES	A R E A S		
	Georgetown	North West District & Berbice R.	Elsewhere
Super	14¢ per pt.	2 pts. for 29¢	14¢ per pt.
White "A"	13¢ per pt.	2 pts. for 27¢	13¢ per pt.
White "B"	2 pts. for 23¢	12¢ per pt.	2 pts. for 23¢
Brown "A"	2 pts. for 23¢	12¢ per pt.	2 pts. for 23¢
Brown "B"	2 pts. for 17¢	9¢ per pt.	2 pts. for 17¢
Mixed Broken	7¢ per pt.	2 pts. for 15¢	7¢ per pt.

The policy as regards rice is to encourage production only in the most suitable areas and to promote measures which will increase productivity and quality of rice.

The Guyana Rice Marketing Board fixed a minimum paddy price of \$6.30 per bag of 140 lbs. net, for dry, clean, winnowed paddy delivered at mills. The Guyana Rice Development Co. purchases paddy according to grades as follows:-

Grade - Extra "A"	-	\$7.80*	per sack of 140 lbs. net
" - "A"	-	7.30*	-do-
" - "B"	-	6.80*	-do-
" - "C"	-	6.30*	-do-
" - "D"	-	4.70	-do-
" - "E"	-	2.90	-do-

* An incentive of 50¢ extra is offered for each bag Blue belle paddy (90% purity) purchased.

The prices of paddy and rice are based on the negotiated prices obtained in the West Indies and other markets. The Guyana Rice Marketing Board which is the sole purchaser and exporter of rice, recommends the prices to be paid which must finally be approved by the Council of Ministers.

General commercial policies aim at meeting the full requirements of the West Indian Markets with an emphasis on packaged rice. The agreement with "Connel Rice and Sugar Inc." to sell bulk rice, outside of the government contracts and the Dutch and French territories of the Caribbean, has been extended for three years starting from 1st January, 1969.

The imports of rice are prohibited by legislation. The Rice Marketing Board is the only agency, with the approval of the government, which could import rice, if the necessity should arise.

No duty is charged on the imports of seed paddy for experimental purposes. Imports are subject to the approval of the Ministry of Agriculture and Natural Resources.

Coconuts: The coconut industry is the third most important industry in the agricultural sector and crops are cultivated both on estate basis and in scattered plantings in villages and along dams of drainage and irrigation canals.

The acreage at the end of December, 1968 was estimated at 45,425 acres (provisional). There was a significant improvement in the production of copra during 1968 as compared with 1967. Production of refined oil showed a slight increase of 4,825 gallons over the 1967 figure, while output of raw oil rose to 60,650 gallons. Nuts collected during the year amounted to 55,206,000 as compared with 36,257,000 in 1967.

Table 26 gives output of coconut and coconut products for the period 1962 to 1968.

Table 26
Output of Coconuts and Coconut Products
1962 - 1968

YEAR	Coconuts No.	Copra Tons	Copra Meal lbs.	Edible Oil Glns.	Raw Oil Glns.	Soap lbs.	Margarine and Lard Compound
1962	49,376,000	6,321	4,235,902	815,908	56,800	4,062,192	1,867,600
1963	45,910,000	5,899	3,447,395	690,900	45,750	4,073,035	1,699,243
1964	53,026,000	5,804	4,358,469	877,895	44,420	4,959,446	1,955,677
1965	35,561,000	4,636	3,073,575	652,650	39,150	4,851,326	2,255,672
1966	43,986,000	5,777	3,596,970	830,075	49,700	4,572,271	2,355,951
1967	36,257,000	4,882	3,834,195	888,075	29,600	3,968,434	2,414,009
1968	55,206,000	7,013	3,815,557	892,900	60,650	4,399,805	2,189,401

The marketing of both green and dried nuts suffers from lack of proper organisation.

Purchasing of copra, however, is relatively centralised, but there was a set-back during the latter part of the year. One of the two mills was destroyed by fire and although the other mill had introduced a shift system, it was not possible, because of storage space, to accommodate all the copra produced. Arrangement was successfully made to export the surplus copra to Trinidad. The Guyana Marketing Corporation was responsible for making all arrangements.

The country still cannot supply local requirements of edible oil. To meet the deficit, heavy imports are made from the Caribbean and other countries.

Table 27 shows imports of copra and some main types of edible oil and fats.

Table 27
Imports of Copra and Some Main Types of Edible
Oil and Fats, 1965 - 1968

COMMODITIES	Unit	1965*	1966*	1967*	1968 ^{a/}
Copra	lbs.	942,592	497,280	1,954,400	761,600
	Value \$	153,533	83,842	688,743	146,593
Soyabean Oil	glns.	346,863	100,466	23,712	134,105
	Value \$	917,080	265,796	82,911	347,023
Cotton Seed Oil	glns.	6,078	-	-	-
	Value \$	23,511	-	-	-
Coconut Oil	glns.	105,287	40,545	96,245	76,050
	Value \$	328,549	111,234	298,509	220,956
Peanut Oil	glns.	517	705	1,073	-
	Value \$	2,399	3,132	4,569	-
Olive Oil	glns.	3,123	4,259	2,829	3,618
	Value \$	21,013	27,416	26,255	30,343
Mustard Oil	glns.	-	672	232	-
	Value \$	-	9,088	1,809	-
Oil from seeds, nuts and kernels n.e.s.	glns.	52,446	2,258	6,699	-
	Value \$	135,691	14,070	30,822	-
Hydrogenated Oils and Fats	lbs.	1,607,984	1,901,610	2,342,863	2,007,040
	Value \$	410,381	497,696	552,888	445,184
	Total Value	1,992,157	1,012,274	1,686,506	1,190,099

* SOURCE: Statistical Bureau

^{a/} Oils and Fats Returns

The average annual gross value of nuts produced over the past ten years at constant cost exceeds \$2m.

Guyana has been an exporter of coconuts for about 100 years from 1850 to about 1950. However, between 1950 and 1960, the supply demand relationship changed unfavourably and Guyana began to face a growing deficit in supply of local copra and oil to meet its requirements for domestic consumption and industrial use.

Table 28 shows the fixed prices for copra and coconut oil, 1968:-

Table 28
Fixed Prices for Copra and Coconut Oil

1. <u>COPRA:</u>			
	Grade I	.....	14½¢ per lb.
	Grade II	.....	13½¢ per lb.
	Grade III	.....	12¾¢ per lb.
2. <u>COCONUT OIL:</u>			
		<u>Deodorized</u>	<u>Crude</u>
	Manufacturers' price per gal.	\$2.69	\$1.92
	Distributors' price per gal.	2.77	-
<u>WHOLESALE PRICE:</u>			
(i)	Drums (40 - 45 gals.) per gal.	2.82	1.96
(ii)	Less than 1 drum per gal.	2.84	1.98
<u>RETAIL PRICE:</u>			
	<u>Area</u>		
(i)	Georgetown per pt.	37¢	26¢
(ii)	Elsewhere other than (iii) per pt.	39¢	26¢
(iii)	North West District and Berbice River per pt.	40¢	28¢

Corn: A quantity of 2,990,000 lbs. corn was reaped in 1968 as against 2,766,300 lbs. in 1967, an increase of 223,700 lbs. The acreage was however lower in 1968, and the increase in yield was due mainly to the distribution of hybrid seeds to farmers by the Ministry of Agriculture, though in some areas, the seeds arrived too late.

In 1969, it is hoped that the full effect of increasing corn production would materialise.

The Guyana Marketing Corporation in 1968, purchased a quantity of 2,089,219 lbs. corn valued at \$140,307 at an average price of 6.7¢ per lb. compared with 2,069,527 lbs. valued at \$131,229 at 6.3¢ per lb. in 1967. Of the quantity purchased by the Guyana Marketing Corporation, 1,875,635 lbs. were sold to the Guyana Stockfeeds Ltd. as against 1,081,673 lbs. in 1967.

Table 29 gives local requirements for corn.

Table 29

Local Requirements for Corn, 1964 - 1968

YEAR	Local Production	Imports	Local Requirement
1964	2,720,800	4,252,044	6,972,844
1965	3,060,000	2,445,349	5,505,349
1966	2,387,000	5,253,981	7,640,981
1967	2,766,300	4,948,920	7,715,220
1968	2,990,000	5,843,105	7,718,740

In 1968, about 39% of Guyana's requirement was met from local production. The value of the 1968 imports totalled \$501,839 at an average price of 8.6¢ per lb.

If one were to aim solely at eliminating importation of corn, an additional area of about 4,300 acres would be required on the assumption that:-

1. The average yield of 1,360 lbs. is obtained (1968 av. yield per acre).
- and 2. That there is no increase in the demand for this commodity.

Both these assumptions are unlikely to be correct since:-

1. The introduction of the hybrid varieties would definitely result in increased yields per acre. In 1968, an average yield of 3,000 lbs. per acre was achieved in some areas.
- and 2. With the government's programme to expand the dairy, pig and poultry industry, the demand for corn by the Guyana Stockfeeds Ltd. would eventually increase.

Trade Prices and Supplies of Farm ProduceCARIFTA:

Trading under the CARIFTA Agreement started as from the 1st May, 1968 and some of the major movements of goods in relation to Guyana are listed below:-

Trinidad Agricultural Marketing Corporation shipped 3,000 lbs. of cabbages, tomatoes, vegetables to Guyana and some to Antigua.

On June the 28th, 6,000 oranges were shipped from Guyana to Barbados under the Carifta Agreement.

In July, Guyana airlifted 6,600 lbs. beef to Trinidad and on the return journey 6,000 lbs. of cabbages and cauliflower were taken back to Guyana from Trinidad. On August 14, another shipment of 6,500 lbs. of Guyana beef was airlifted to Trinidad.

As far as Guyana is concerned, her part in Carifta is reckoned to be a most useful one. There are three exceptionally good opportunities and possibly a fourth for Guyana in CARIFTA.

- (1) Beef
 (2) Rice
 (3) Corn
 and (4) Timber and Paper

Table 30
Exports of Some Major Agricultural Commodities
1964 - 1968

COMMODITIES	Unit	1964	1965	1966	1967	1968* (Provisional)
Sugar	Tons	234,658	266,604	279,141	293,313	301,739
	₤	53,864,810	43,349,143	46,493,805	54,569,717	n.a.
Rum	Pf. Glns.	1,871,246	2,065,150	1,665,730	3,128,916	582,781 ^{a/}
	₤	3,285,958	4,257,918	3,360,969	5,696,451	1,245,086
Molasses	Glns.	14,168,504	12,006,160	12,449,664	14,305,896 ^{1/}	16,222,460
	₤	4,037,438	2,109,043	2,760,516	4,669,370	4,495,266
Rice	Tons	80,572	99,231	100,638	94,377	93,337
	₤	22,199,754	22,950,006	23,424,615	24,034,692	27,632,591
Plantains	lbs.	2,481,721	1,217,563	642,439	379,549	19,154 ^{b/}
	₤	92,280	43,913	24,482	15,564	1,594 ^{b/}
Beef	lbs.	392,784	818,287	303,852	750	45,000 ^{b/}
	₤	157,621	353,681	198,524	541	22,500 ^{b/}
Cattle	Head	423	401	630	801	194 ^{b/}
	₤	63,029	66,000	90,231	102,850	29,000 ^{b/}
Hides	lbs.	216,653	223,078	222,707	200,147	66,344 ^{b/}
	₤	20,669	26,116	37,314	34,437	7,895 ^{b/}
Shrimps	lbs.	5,576,880	7,907,635	9,439,813	8,822,501	9,135,243
	₤	4,248,192	5,443,876	6,461,103	5,983,897	n.a.
Cocoa Beans	lbs.	23,968	29,344	19,152	14,112	-
	₤	7,626	2,560	17,045	3,986	-
Coffee Beans	lbs.	332,752	258,272	289,184	402,528	250,656 ^{b/}
	₤	142,703	121,063	83,308	81,571	119,747 ^{b/}

* Provisional figures and for the whole of 1968 except as otherwise indicated.

^{1/} Revised

^{a/} January-May

^{b/} January-April

Table 31 gives the imports of some selected agricultural commodities which can be produced in Guyana or for which substitutes can be had.

Table 32 shows the movement of produce in the Municipal Markets in Georgetown, and table 33 gives produce landing at the T & H.D. wharf from Parika, North West District and the Pomeroon.

Tables 34 and 35 show prices received by farmers and retail prices in the Georgetown Markets.

On the whole there were much variations in the 1968 prices in comparison with 1967. For 12 selected commodities purchased by the Guyana Marketing Corporation, the average prices paid to farmers in 1968 are shown below as against the 1967 prices.

COMMODITIES	Unit	Average Price Paid by G.M.C. (cents)	
		1967	1968
Plantains	lb.	3.8	6.2
Cassava	"	2.6	2.3
Yams	"	7.6	8.6
Eddoes	"	6.4	6.1
Sweet Potatoes	"	8.5	9.1
Bananas	"	3.7	4.1
Pumpkins	"	3.9	3.7
Corn	"	6.3	6.7
Oranges	"	3.2	2.8
Tomatoes	"	38.8	31.8
Blackeye Peas	"	21.9	14.0
Cabbages	"	26.8	23.4

The following are the retail price in the Municipal Markets for the twelve commodities:-

COMMODITIES	Unit	Average retail price (cents) in the Municipal Markets	
		1967	1968
Plantains	lb.	7.7	12.7
Cassava	"	11.1	12.9
Yams	"	14.4	14.0
Eddoes	"	10.3	11.8
Sweet Potatoes	"	16.8	17.9
Bananas	"	8.4	9.7
Pumpkins	"	8.7	8.0
Corn	"	9.3	10.0
Oranges	"	14.7	14.5
Tomatoes	"	44.0	43.4
Blackeye Peas	"	37.1	41.8
Cabbages	"	65.3	35.9

Table 31

Imports of Some Selected Agricultural Commodities which
can be Produced in Guyana or for which Substitutes
can be had, 1965 - 1968

COMMODITIES	Unit	1965	1966	1967 Revised	1968* Provisional
Onions	lb.	4,722,972	4,951,420	5,248,746	4,927,816
	§	469,598	488,992	576,051	553,443
Carrots	lb.	217,940	146,886	138,243	23,403
	§	45,523	33,661	38,734	7,887
Peanuts	lb.	1,235,264	908,768	1,191,592	677,992
	§	361,552	294,993	278,317	200,347
Cabbages	lb.	557,902	405,716	154,659	n.a.
	§	101,850	83,624	26,959	"
Orange Juice	glns.	179,581	391,192	186,212	173,269
	§	386,345	535,305	442,059	392,536
Tomatoes	lb.	20,906	20,378	13,760	1,000
	§	3,226	4,002	2,907	280
Black Pepper	lb.	68,396	81,522	54,608	62,058
	§	47,262	60,896	33,347	40,943
Ginger	lb.	101,874	91,726	52,024	57,133
	§	54,837	46,544	25,899	32,137
Tapioca	lb.	134,695	163,866	216,108	308,705
	§	19,360	24,708	34,254	87,688
Cocoa Powder	lb.	259,521	214,206	192,121	91,236
	§	212,702	196,761	180,509	92,359
Turmeric	lb.	n.a.	108,345	36,792	27,038
	§	n.a.	34,832	10,932	10,562
Tomato Paste	lb.	646,437	753,250	1,020,492	273,871
	§	196,165	251,414	292,138	102,497
Castor Oil	lb.	42,445	35,594	22,559	20,140
	§	15,163	12,448	9,420	10,757
Blackeye Peas	lb.	134,230	332,545	15,000	108,500
	§	27,387	65,964	2,721	31,336
Split Peas	lb.	7,712,143 ^{***}	4,673,286	6,695,647	5,423,834
	§	1,017,713	627,407	944,083	941,116
Other Peas & Beans	lb.	-	2,326,858	160,211	423,696
	§	-	320,743	41,467	103,713
Poultry (killed or dressed)	lb.	43,036	30,001	48,071	28,230
	§	40,071	27,688	38,839	32,294
Corn (Maize) (Unmilled)	lb.	2,445,349	5,253,981	4,948,920	5,843,105
	§	204,224	446,048	480,529	501,839

* Provisional - Subject to revision.

*** Include other Peas and Beans except Blackeye.

Table 32

Some Selected Agricultural Commodities Moving in the
Municipal Markets by Months, 1967 and 1968

COMMODITIES	Unit	1 9 6 7												Total
		January	February	March	April	May	June	July	August	September	October	November	December	
Plantains	lbs.	331,650	355,140	324,180	391,800	286,500	261,900	217,800	207,900	274,260	205,560	227,820	255,630	3,340,140
Cassava	"	223,500	228,450	191,700	204,600	179,700	165,900	172,650	153,750	170,100	177,300	192,300	148,500	2,208,450
Eddoes	"	138,900	150,150	148,350	123,150	110,850	105,900	114,900	127,200	109,650	123,450	124,500	101,550	1,478,550
Sweet Potatoes	"	130,050	121,650	107,850	127,650	119,400	99,300	99,300	98,100	101,400	105,900	111,150	93,900	1,315,650
Yams	"	156,240	141,660	122,580	145,440	131,040	116,640	121,680	113,220	124,920	127,080	135,900	118,980	1,555,380
Tannias	"	116,850	108,900	91,950	106,650	97,350	88,650	87,150	82,350	88,650	6,120	99,000	82,500	1,056,120
Corn	"	6,660	17,280	11,160	31,140	23,580	28,080	9,540	10,800	6,660	6,120	3,600	6,480	161,100
Coffee	"	25,760	23,080	12,770	6,730	16,360	4,930	7,840	32,030	8,730	21,280	30,460	8,970	198,940
Pumpkins	No.	2,890	3,320	2,550	2,210	1,580	2,600	2,510	2,530	1,690	1,130	1,220	1,480	25,710
1 9 6 8														
Plantains	lbs.	229,260	162,561	163,740	153,021	182,670	212,310	341,626	348,380	310,945	346,776	364,486	233,005	3,048,780
Cassava	"	177,600	134,138	138,300	144,863	139,800	139,050	231,744	174,322	126,487	152,203	148,336	154,741	1,861,584
Eddoes	"	115,650	106,320	101,850	93,420	116,850	99,300	153,004	126,664	100,191	120,826	115,125	96,427	1,345,627
Sweet Potatoes	"	109,950	90,593	89,700	96,293	99,000	93,150	125,583	112,528	99,446	108,156	108,191	85,288	1,217,878
Yams	"	121,680	111,951	106,200	109,071	120,060	98,100	137,820	121,798	106,226	124,237	121,511	96,598	1,375,252
Tannias	"	92,250	80,828	77,700	81,428	85,950	77,400	116,415	101,124	82,594	94,104	94,615	76,513	1,060,921
Corn	"	13,140	26,550	18,900	4,860	2,520	4,750	20,160	10,080	5,580	4,320	6,300	6,660	123,820
Coffee	"	23,080	22,840	20,608	31,360	25,984	110	21,952	14,112	27,552	20,832	26,656	26,656	261,742
Pumpkins	No.	3,530	3,060	3,200	2,100	2,230	2,990	3,180	3,640	2,590	1,450	1,800	27,900	57,670

Table 33

Some Agricultural Produce Landed at the T. & H.D. Wharf from Parika, Pomeroun
and the North West District by Months, 1968

COMMODITIES	Unit	January	February	March	April	May	June	July	August	September	October	November	December
Plantains	lbs.	142,460	16,265	23,182	71,479	98,574	62,483	67,327	71,719	71,231	71,743	117,203	219,960
Cassava	"	-	-	13,227	38,472	36,504	25,473	14,594	28,007	20,725	48,490	30,610	67,498
Eddoes	"	6,838	7,464	19,961	48,152	40,552	40,042	18,680	18,540	49,126	41,239	32,168	45,182
Yams	"	6,054	5,500	16,882	81,355	80,353	62,598	17,346	20,386	14,273	31,818	24,373	38,228
Tannias	"	-	-	14,084	41,730	37,838	28,091	18,143	16,116	13,575	28,076	21,457	30,937
Sweet Potatoes	"	-	-	19,982	50,555	46,667	38,417	18,770	19,109	20,804	33,477	25,116	35,132
Mixed Fruits	"	-	-	30,552	36,107	64,857	336,007	436,779	194,300	109,529	160,294	69,074	96,524
Oranges	"	-	-	5,245	5,420	975	845	4,435	27,750	48,272	122,174	29,306	65,590
Limes	"	-	-	3,201	4,601	2,748	1,435	2,087	1,360	2,367	3,760	205	300
Lemons	"	-	-	-	-	290	4,475	720	-	130	-	-	260
Grapefruits	"	-	-	840	19,835	-	-	-	-	668	-	2,836	-
Bananas	"	-	-	6,760	11,220	27,774	21,168	24,778	51,073	36,667	30,189	15,712	49,316
Blackeye Peas	"	-	-	3,010	480	16,912	23,256	2,657	403	6,665	936	1,025	708
Corn	"	21,126	94,284	267,517	192,773	47,916	900	47,511	310,242	459,686	453,986	93,534	4,002
Coffee	"	74,348	75,502	123,975	58,450	45,167	43,860	31,081	-	55,180	33,669	27,265	34,966
Cocoa	"	-	-	253	327	74	1,388	563	-	826	1,878	2,181	510
Squashes	"	-	-	6,033	7,777	5,959	1,411	-	-	-	-	-	85
Cucumbers	"	-	-	-	605	75	2,307	1,882	-	-	88	-	4,960
Pumpkins	"	6,588	17,829	12,552	5,377	4,818	10,612	16,849	3,928	15	800	490	1,096
Cabbages	"	300	-	-	2,280	-	270	-	-	-	-	-	-
Ginger	"	-	-	819	100	185	307	195	562	1,777	1,650	2,415	1,490
Peanuts	"	-	-	2,100	1,086	-	-	-	1,960	2,963	500	-	300
Pears	"	-	-	-	-	-	-	12,964	8,885	2,168	-	-	-

Table 34

Average Prices Received by Farmers (Cents) in the Georgetown Markets, 1968

COMMODITIES	Unit	January	February	March	April	May	June	July	August	September	October	November	December	Annual Average
Plantains	lb.	8.1	8.8	11.2	10.4	10.4	10.1	9.2	8.8	8.5	7.7	7.4	6.3	8.9
Cassava	"	10.5	10.4	10.7	10.3	9.8	9.1	9.1	9.4	8.4	7.3	6.1	6.4	9.0
Eddoes	"	8.7	9.9	9.9	8.7	9.2	8.9	8.7	8.7	7.8	6.4	6.0	5.1	8.2
Sweet Potatoes	"	14.0	15.7	14.7	14.9	13.3	12.9	14.0	14.6	14.8	12.9	11.9	10.4	13.7
Yams	"	9.8	7.9	8.9	9.3	9.1	9.8	10.8	10.6	12.3	13.9	10.6	10.1	10.3
Tannias	"	11.3	11.0	14.3	15.4	16.4	14.8	15.7	16.0	15.9	15.9	11.5	10.5	14.1
Tomatoes	"	29.0	24.0	21.7	20.4	33.8	42.7	50.3	48.7	43.1	43.4	32.6	26.9	34.7
Cabbages	"	30.0	30.1	30.0	30.6	29.8	30.7	32.0	-	28.3	28.4	-	36.3	30.6
Pumpkins	"	5.9	5.3	4.7	5.5	6.1	4.9	4.9	4.6	6.0	6.1	4.3	2.9	5.1
Oranges	per 100	\$2.88	\$3.75	\$5.24	\$4.46	\$4.07	\$3.27	\$2.57	\$1.90	\$2.13	\$2.54	\$2.50	\$1.90	\$3.10
Grapefruit	"	3.88	4.18	5.06	6.37	7.46	5.00	4.21	3.45	3.03	2.91	3.30	2.50	4.28
Tangerines	"	3.17	3.25	3.50	4.84	4.27	3.14	2.33	2.64	4.20	4.51	3.20	3.40	3.54
Limes	"	1.72	2.26	1.67	1.29	1.16	1.09	1.52	1.34	1.45	2.34	3.20	3.60	1.89
Avocado Pears	"	11.00	12.10	13.83	9.40	7.18	6.28	5.55	5.47	6.12	6.26	11.00	10.40	8.72
Cayenne Bananas	lb.	9.6	9.4	8.6	11.0	10.6	10.2	9.6	9.0	9.6	8.2	7.6	7.7	9.3
Apple Bananas	"	6.8	6.7	6.6	8.1	7.7	7.3	7.2	7.1	6.8	6.4	8.1	5.8	7.1
Fig Bananas	"	4.0	3.9	3.2	3.5	4.1	4.1	4.1	3.8	4.0	3.9	3.6	3.8	3.8
Blackeye Peas	"	36.0	38.0	36.4	34.0	36.5	34.9	35.8	36.1	35.5	34.4	33.6	27.4	34.9
Coffee Beans	"	52.3	52.4	48.8	46.2	45.6	43.3	46.2	47.2	45.7	44.4	42.8	40.6	46.3
Ginger	"	99.0	94.8	90.0	98.1	\$1.01	\$1.02	96.1	90.2	89.8	89.7	91.3	-	94.7
Corn	"	6.3	6.8	5.7	6.1	7.0	7.3	7.4	7.1	7.2	6.8	6.8	5.6	6.7
Cocoa	"	40.5	40.0	35.9	36.5	37.7	37.1	36.9	36.2	33.3	35.2	29.3	27.1	35.5

Table 35

Average Retail Prices (Cents) in the Municipal Markets for some Selected
Agricultural Commodities by Months, 1968

COMMODITIES	Unit	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Av.
<u>TUBERS AND SIMILAR PRODUCE</u>														
Plantains	Per lb.	11.8	13.5	15.9	14.0	13.5	13.4	12.3	12.0	11.8	11.6	11.2	11.0	12.7
Cassava	"	14.9	15.0	15.0	13.7	12.3	12.1	12.3	12.5	12.0	11.9	11.2	11.9	12.9
Eddoes	"	14.7	16.2	13.8	11.3	11.3	11.3	11.3	11.4	10.6	9.7	10.0	9.4	11.8
Sweet Potatoes	"	20.6	20.0	19.2	18.5	16.3	16.4	17.1	18.2	18.4	17.1	16.3	16.3	17.9
Yams	"	13.8	12.0	12.5	12.3	12.7	12.8	13.2	13.9	15.1	18.2	15.4	15.9	14.0
Tannias	"	15.3	16.4	19.6	19.2	19.9	19.6	19.3	19.5	19.5	19.4	16.6	17.0	18.4
<u>GREEN AND OTHER VEGETABLES</u>														
Tomatoes	Per lb.	39.4	31.7	26.2	24.7	40.3	52.7	58.6	60.5	51.1	51.9	44.6	39.6	43.4
Eschallot	"	63.4	56.1	66.4	46.8	51.1	54.1	53.1	68.1	67.5	56.8	56.7	64.7	58.7
Boulangers	"	13.8	12.0	10.8	8.2	8.5	10.9	17.8	14.4	18.0	18.9	16.7	18.1	14.0
Cucumber	"	7.9	8.1	13.7	14.9	10.8	11.4	11.7	14.3	18.1	16.7	9.4	8.7	12.1
Lettuce	"	32.0	29.2	28.0	25.6	34.8	28.9	26.5	27.2	28.0	28.9	60.2	57.4	33.9
Cabbages	"	36.0	36.0	35.5	35.7	35.5	36.0	36.0	36.0	36.0	36.0	36.0	36.0	35.9
Calaloo	"	8.9	9.1	8.5	9.8	8.3	8.4	8.8	8.3	8.4	9.2	9.5	10.0	8.9
Pumpkins	"	9.6	9.5	8.5	8.4	9.0	7.2	6.7	6.7	8.5	8.2	7.8	5.6	8.0
Bora	"	17.8	15.9	16.4	26.9	21.1	19.3	18.9	13.7	14.8	19.2	19.2	22.9	18.8
Ochroes	"	24.5	20.9	16.1	18.7	18.0	17.7	17.9	16.8	16.9	18.3	23.5	24.9	19.5
<u>FRUITS</u>														
Oranges	Per lb.	17.5	18.6	20.2	20.4	16.4	13.6	9.8	9.0	9.8	11.7	13.2	13.8	14.5
Grapefruits	"	10.2	10.4	13.7	15.7	15.2	10.9	9.1	8.4	8.0	10.1	8.3	8.5	10.7
Tangerines	"	32.3	29.6	45.0	29.1	30.9	24.3	17.1	20.6	30.7	31.8	31.5	33.2	29.7
Limes	"	22.4	20.5	20.6	14.1	13.0	14.0	16.7	15.6	16.8	23.8	32.6	37.8	20.7
Papaws	"	-	-	22.1	17.1	19.3	16.2	14.4	17.9	18.7	20.5	20.1	15.7	18.2
Avocado Pears	"	43.5	45.8	41.0	39.1	26.6	24.1	24.5	26.1	26.2	28.1	54.7	53.7	36.1
Pineapples	"	27.8	23.6	32.4	26.5	29.5	20.3	21.7	20.1	26.3	38.7	28.7	22.8	26.5
Cayenne Bananas	"	12.1	12.2	12.4	13.7	13.4	13.1	12.4	12.6	11.9	12.2	15.4	12.9	12.9

Apple Bananas	"	10.1	10.0	9.7	10.1	9.9	10.1	9.7	9.8	9.7	9.5	9.7	10.1	9.9
Fig Bananas	"	6.2	5.8	5.3	6.4	6.6	6.1	5.8	6.0	6.3	6.4	6.8	6.9	6.2
Mangoes	"	17.8	13.8	11.4	18.6	18.0	19.5	20.8	21.5	21.7	18.6	15.4	10.4	17.3
<u>PEAS AND BEANS</u>														
Blackeye Peas	Per lb.	42.0	42.0	39.9	40.9	41.8	40.9	41.2	41.3	41.4	47.1	41.5	41.6	41.8
Coffee Beans	"	63.1	63.7	55.7	57.3	53.3	53.9	52.4	53.3	53.1	53.2	53.7	55.6	55.7
Cocoa Beans	"	44.5	44.0	43.7	45.5	44.1	44.4	43.5	43.8	41.8	42.2	37.9	36.4	42.7
<u>OTHERS</u>														
Ginger	Per lb.	121.0	120.0	119.0	117.0	119.0	117.0	119.0	120.0	120.0	120.0	113.0	-	118.6
Corn	"	9.5	9.4	9.7	9.9	9.8	10.3	10.4	10.1	10.1	10.3	10.2	10.5	10.0
Peppers	"	119.0	54.5	55.1	56.5	38.4	32.1	29.8	29.9	30.1	34.7	46.5	55.4	48.5
<u>MEAT</u>														
Rib and Round Steak	"	64.0	64.5	67.4	65.3	67.9	67.7	68.0	68.0	67.9	67.9	64.6	59.7	66.1
Brisket	"	60.0	60.1	61.1	59.8	60.0	59.9	59.9	60.0	60.0	60.0	56.3	51.4	59.0
Pork	"	75.0	75.0	75.6	75.1	75.0	75.0	75.2	75.0	75.1	75.1	74.7	74.1	75.0
Chicken (Live)	"	63.3	62.5	65.8	67.8	67.5	68.3	68.3	68.2	68.2	68.1	65.5	69.1	66.9
Chicken (Dressed)	"	90.3	90.8	91.9	99.0	101.0	104.0	100.0	100.0	97.8	97.3	100.0	90.0	96.9
Mutton	"	111.0	110.0	100.0	112.0	100.0	110.0	110.0	110.0	112.0	112.0	110.0	115.0	109.3
<u>FISH</u>														
Red Snapper	"	96.7	-	87.2	82.4	79.6	77.3	77.3	71.8	81.3	78.8	80.5	78.3	81.0
Grey Snapper	"	80.0	75.8	74.0	69.6	67.9	64.8	61.9	62.3	61.6	58.7	59.4	58.7	66.2
Queriman	"	89.0	89.4	80.1	60.6	64.2	57.3	57.1	57.0	62.9	62.8	62.9	57.3	66.7
Snook	"	59.0	-	64.0	65.8	68.8	69.1	62.4	58.0	54.6	54.9	46.5	57.8	60.1
Bashaw	"	60.5	58.8	59.4	40.0	-	54.4	53.8	50.3	43.0	-	29.9	27.5	47.8
Sea Trout	"	64.0	-	45.0	53.8	45.0	53.3	41.7	41.8	46.5	-	50.0	47.6	48.9
Croakers	"	45.6	48.9	41.6	31.4	30.0	25.0	28.0	28.0	25.0	19.9	17.6	27.7	30.7
Banga-Mary	"	26.6	25.0	24.0	21.5	23.9	24.9	25.0	24.6	25.0	24.5	24.6	17.5	23.9

Livestock: Table 36 shows the general livestock situation in the country for 1968 compared with 1967.

Table 36
Livestock and Livestock Products, 1967 and 1968

CLASSIFICATION	Unit	1967	1968	% Increase or Decrease
<u>Population:</u>				
Cattle	No. Heads	305,500	n.a.	n.a.
Pigs	"	83,300	n.a.	n.a.
Sheep	"	100,000	n.a.	n.a.
Goats	"	42,300	n.a.	n.a.
Poultry ^{a/}	"	4,562,000	n.a.	n.a.
<u>Livestock Slaughtered:</u>				
Cattle	No. Heads	27,836	29,041	+ 4.3
Pigs	"	18,381	22,949	+24.9
Sheep	"	4,836	5,060	+ 4.6
Goats	"	413	356	-13.8
Poultry ^{a/}	"	1,871,319	2,009,305	+ 7.4
<u>Meat Production:</u>				
Beef	lbs.	8,648,441	8,782,762	+ 1.6
Pork	"	1,701,093	2,149,657	+26.4
Mutton	"	108,556	106,722	- 1.7
Goat-Meat	"	9,468	7,517	-20.6
Poultry-Meat ^{a/}	"	5,473,421	5,923,006	+ 8.2
<u>Livestock Products:</u>				
Milk	glns.	4,268,700	n.a.	n.a.
Eggs	No.	15,715,364	21,002,953	+33.6
Bacon	lbs.	108,793	106,016	- 2.6
Ham	"	62,216	75,564	+21.5
Sausage	"	2,388	3,254	+36.3

^{a/} Major Producers

n.a. Not Available

The main types of livestock reared in the country are cattle, poultry, pigs, sheep and goats. A number of horses, mules and asses are kept but these are of declining economic importance.

Cattle: The cattle population of Guyana consists mainly of Creole, Brahman, Holstein and Santa Gertrudis. Cattle are reared both for milk and beef.

- (a) **Beef:** Beef production is concentrated in the Rupununi Savannahs, the intermediate Savannahs and on the Coastal Savannahs.

In the Rupununi, owing to the low productivity, beef cattle are reared on the extensive basis and production is organised by large companies. Cattle are carried on

unimproved pastures and are not ready for slaughter until 6 - 7 years of age. The estimated population is around 45 - 50,800 heads.

The only significant development in the Intermediate Savannah is the Research Station at Ebini, where breeding stocks for beef production are made available to farmers.

On the coastland, of primary importance, is the well managed Kabawer Ranch which has a cattle population of about 6,500 animals. The majority of the peasant owned cattle are mainly dual-purpose i.e. for beef and milk.

In 1968, 29,041 animals were slaughtered yielding 8,782,762 lbs. beef compared with 27,836 animals in 1967 producing 8,648,441. Although there was an increase in the number of cattle slaughtered in 1968, by 1,205 or 4.3% over 1967, the average weight per animal slaughtered fell from 311 lbs. in 1967 to 302 lbs. in 1968.

9,389 head or about 32% of the total number of animals slaughtered took place in the Municipal Abattoir in Georgetown and 5,302 head or 18% at the Lethem Abattoir.

Table 37 shows animals slaughtered at the Municipal Abattoir in Georgetown by months and by areas.

Table 37

Cattle Slaughtered at the Municipal Abattoir in Georgetown by Areas and by Months, 1968

Months	Berbice	E.C. Dem	E.B. Dem.	W.C. Dem.	W.B. Dem	Esseq.	Total
January	412	258	7	8	8	49	742
February	408	201	16	10	9	89	733
March	448	291	13	13	99	42	816
April	424	186	12	14	12	90	738
May	377	264	28	17	15	139	840
June	463	182	19	16	15	61	756
July	409	266	14	15	11	95	810
August	649	162	-	6	-	72	889
September	432	245	15	12	15	76	795
October	372	210	12	8	5	91	698
November	313	240	11	12	7	96	679
December	447	275	25	15	13	118	893
Total - 1968	5,154	2,780	172	146	119	1,018	9,389

(b) Milk: Dairying is encouraged on the coastal and riverain lands. The only recognised modern dairy farm in the country is owned and operated by "Bookers' Estates". There are many small farmers who maintain from one to about 30 milch cows and milk is produced on a semi-intensive basis.

In the Mahaica/Mahaicony/Abary region, cattle rearing is carried on as a subsidiary activity, with rice farming as the main occupation. Milk supplied to the G.P.P. from this area, however, fluctuates seasonally since during the periods when the rice cultivations require much attention, farmers do very little milking. Table 38 shows intake and sales of milk by the Government Pasteurisation Plant, 1967 and 1968.

Table 38

Intake and Sales of Liquid Milk by the Government
Pasteurisation Plant, 1967 and 1968.

Months	Intake (glns.)		Sales (glns.)	
	1967	1968	1967	1968
January	60,731	70,715	34,941	44,780
February	61,101	77,809	37,429	45,406
March	67,711	77,426	42,315	49,984
April	60,779	63,168	38,573	47,176
May	51,447	58,414	41,705	55,057
June	37,199	47,256	42,334	47,854
July	34,675	42,325	38,846	49,474
August	33,515	37,185	37,788	44,438
September	33,913	30,411	38,176	38,252
October	36,075	30,395	40,996	41,239
November	35,582	34,832	37,560	42,110
December	53,915	46,397	42,460	45,634
Total	566,643	616,333	473,123	551,404

Table 39 gives values of imports of all milk and milk products for the period 1963 to 1967.

Table 39

Value of Imports of Milk and Milk Products,
1963 - 1967

T Y P E S	V A L U E \$ (C.I.F.)				
	1963 ^x	1964	1965 ^x	1966 ^x	1967 ^x
Milk and cream, fresh	3,489	1,727	993	225	2,487
Milk and cream, evaporated unsweetened	1,440,605	2,128,141	2,318,159	2,838,559	2,826,214
Milk and cream, condensed sweetened	832,491	817,578	814,365	781,063	822,000
Milk and cream, dried	881,577	1,275,803	1,435,492	1,728,543	1,638,156
Butter, fresh and salted	623,440	617,040	885,831	848,563	680,953
Ghee	4,455	29,741	5,968	3,353	-
Cheese	435,715	701,938	556,644	659,162	718,995
Other dairy products, ice cream powders, ice cream etc. n.e.s.	1,057,182	917,510	1,235,040	1,334,992	1,465,381
Total	5,278,954	6,489,478	7,252,492	8,194,460	8,154,186

1968 information not available

x Provisional

Figs: In 1968, 22,948 head of pigs were officially reported slaughtered, yielding an estimated 2,149,657 lbs. of pork in comparison with 18,381 heads in 1967 with an estimated yield of 1,701,093 lbs.

Ham production also moved up by 21.5%; 75,564 lbs. in 1968 compared with 62,216 lbs. in 1967. Bacon fell from 108,793 lbs. in 1967 to 106,016 lbs. in 1968 or 2.6%.

Sheep and Goats: There were no major developments in the production of sheep and goats.

Poultry and Eggs: The poultry industry is tending towards specialization and large scale intensive production of both broilers and layers. The country has almost reached self-sufficiency in poultry meat and eggs for consumption, but breeding stocks and hatching eggs are still not produced in adequate quantities locally because optimum technical efficiency has not yet been achieved in this aspect of the industry.

The factors which have contributed to the rapid growth of the poultry industry are:-

- (1) Direct transfer of technology from more advanced countries;
 - (2) Industrialisation of production, processing and marketing of poultry and eggs;
 - (3) Adequate supplies of feeding stuffs;
 - (4) Availability of imported and to a limited extent, locally bred chicks;
- and (5) Improvement in the supplies of veterinary drugs etc.

Commercial production of poultry meat in 1968 is estimated at 5,923,000 lbs. an increase of 8.2% over the 1967 production of 5,473,421 lbs.

Egg production by major producers also moved up by 33.6% from 15,715,364 to 21,002,952 in 1968.

Bees: In 1968, those apiaries which were located in the fruit bearing districts saved the bee-keeping industry from disaster. Weather conditions were definitely against the Courida, the main source of nectar and also the humid weather conditions made it difficult for anything substantial to be produced from the coconut blossoms.

Production of honey was estimated at 60,000 lbs., extracted from about 1,000 colonies which produced an average of 60 lbs. each. Production in 1967 was estimated at 68,000 lbs. Beeswax production was estimated at 1,000 lbs. in 1968 compared with 1,100 lbs. in 1967.

With the fall in production, prices went up, but the demand for honey continued to be good. As a result, some business firms applied for licences to import honey.

In bulk, the price of honey averaged 50 cents per lb. or \$8.00 per gallon. In the bottled wholesale trade, the price rose from \$7.00 per dozen (10 oz. bottles) to \$8.40. The retail price was \$1.00 per 1-lb. jar.

The demand for beeswax was good, and almost all which were produced during the year were sold.

Table 40 gives some data on the bee-keeping industry.

Table 40
No. of Hives and Production of Honey and Wax
1965 - 1968

YEAR	Supered Hives at the end of year (No.)	Unsupered Hives at the end of year (No.)	Production of honey (lbs.)	Production of beeswax (lbs.)	New Hives Est. during the year
1965	1,562	422	110,000	2,000	82
1966	1,568	430	80,000	1,700	65
1967	1,512	231	68,000	1,100	-
1968	1,378	260	60,000	1,000	-

Fish and Shrimps: There were one hundred and forty three (143) trawlers and over eight hundred (800) small boats in operation during the year.

The Georgetown Sea Foods landed 5,182,330 lbs. of shrimp and exported 5,362,156 lbs.

Guyana Industrial Holdings Limited landed 3,978,671 lbs. of Shrimp and exported 3,773,087 lbs.

The Guyana Marketing Corporation purchased 1,234,937 lbs. of Fish valued \$333,234.76. This includes 590,819 lbs. landed by the 'Chikena' a local trawler owned and operated by Mr. Butters.

Fish passing through the Municipal Markets in Georgetown amounted to 21,120,530 lbs.

Guyana Industrial Holdings purchased 25,395 lbs. and exported 20,880 lbs. of fish glue.

Mr. Beresford purchased 42,581 lbs. and exported 40,284 lbs. of fish glue.

Table 41

EXPORTS: Total Values of Exports of Domestic Produce Related to Agriculture and their Percentage of the Total Value of Exports of Domestic Produce

	1960	1961	1962	1963 ^{a/}	1964	1965 ^{a/}	1966 ^{a/}	1967 ^{a/}
Live animals chiefly for food	54,234	119,740	121,067	88,258	82,856	73,540	97,152	117,696
Meat and meat preparations	49,256	22,389	15,781	5,561	159,449	358,419	200,396	958
Dairy products eggs and honey	2,919	3,999	2,621	2,372	2,663	1,867	1,918	2,385
Fish and fish preparations	1,652,646	2,741,376	3,366,245	3,868,915	4,796,773	5,895,111	7,022,459	6,853,737
Fruits and vegetables	222,564	235,167	305,999	99,218	185,754	106,281	120,706	128,102
Sugar and sugar preparations	60,245,791	59,545,089	62,289,237	79,248,763	57,946,969	46,060,264	51,311,131	59,261,366
Coffee, tea, cocoa, spices and manufactures thereof	271,208	146,113	123,206	125,827	162,275	125,732	120,612	97,870
Feeding stuff for animals (not including unmilled cereals)	320,569	420,262	556,771	328,390	285,403	383,937	562,422	383,044
Miscellaneous food preparations	25,008	30,832	26,351	32,911	41,729	51,711	42,172	54,340
Beverages	3,132,201	3,182,229	3,312,535	3,184,715	3,369,069	4,338,692	3,511,849	5,788,960
Tobacco and tobacco manufactures	632	711	695	7,616	556	1,130	929	1,902
Hide skins and fur skins undressed	43,158	34,535	30,984	25,630	20,669	26,116	37,314	34,437
Oil seeds, oil nuts and oil kernels	-	-	-	-	-	-	-	-
Animal and vegetable oils (not essential oils), fats, greases and derivatives	1	301	218	22	33	48	28	1,471
Cereal and cereal preparations	15,422,337	23,034,208	19,858,766	23,002,343	22,232,184	29,984,475	23,446,402	24,042,677
Essential oils and perfume materials, toilet, polishing and cleansing preparations	584,089	541,052	593,742	561,989	737,479	592,951	666,739	627,027
Live animals other than for food	241,694	242,347	223,161	276,710	428,708	12,232	13,471	15,803
T O T A L	82,268,307	90,300,350	90,827,379	110,859,240	90,452,569	88,012,506	87,155,700	97,411,775
TOTAL DOMESTIC EXPORTS	125,031,184	146,907,504	160,418,420	175,804,792	160,680,786	166,213,577	181,149,255	190,745,122
PERCENTAGE	65.80	61.47	56.62	63.05	56.29	52.95	48.11	51.07

a/ Estimated

Table 42

IMPORTS: Total Values of Net Imports of Agricultural Merchandise and their percentage of the Total Value of Net Imports

	1960	1961	1962	1963 ^{a/}	1964	1965 ^{a/}	1966 ^{a/}	1967 ^{a/}
Live animals chiefly for food	140,824	61,235	59,415	111,679	207,172	277,696	258,918	166,061
Meat and meat preparations	2,053,955	2,233,855	2,003,654	2,000,036	2,202,685	2,651,995	2,989,267	2,631,864
Dairy products, eggs and honey	5,686,601	5,666,578	5,512,370	5,279,514	6,491,539	7,359,290	8,480,322	8,536,179
Fish and fish preparations	2,370,797	2,213,231	2,351,658	2,209,929	2,571,613	2,690,512	2,643,850	2,990,015
Cereal and cereal preparations	5,329,405	5,964,966	8,423,912	6,610,052	7,952,851	6,937,080	8,137,265	8,837,855
Fruits and vegetables	4,188,775	4,193,594	4,318,497	4,472,124	4,984,674	5,640,215	5,974,333	5,990,932
Sugar and sugar preparations	337,107	389,652	297,499	291,254	226,939	422,781	423,068	404,687
Coffee, tea, cocoa, spices and manufactures thereof	1,716,905	1,864,493	1,415,372	1,470,697	1,569,858	1,668,706	1,734,889	1,637,952
Feeding stuff for animals (not including unmilled cereals).	1,436,603	1,482,314	980,271	521,922	498,629	631,941	637,399	311,076
Miscellaneous food preparations	1,433,281	1,384,401	1,523,623	1,598,615	1,612,520	2,035,927	2,077,801	1,909,763
Beverages	1,287,103	1,428,054	867,312	858,051	863,173	1,037,057	1,168,365	1,118,777
Tobacco and tobacco manufactures	828,093	943,304	799,839	92,208	866,146	856,921	952,713	906,134
Hides, skins and fur skins undressed	-	1,018	-70	-19	-	-	-	466
Oil seeds, oil nuts and oil kernels	3,612	100,716	2,429	4,014	2,411	158,957	88,116	1,392,041
Animal and vegetable oils (not essential oils), fats, greases and derivatives	1,799,545	1,369,198	568,652	1,302,222	1,172,301	2,606,928	1,743,218	1,759,616
Essential oil and perfume materials, toilet, polishing and cleansing preparations	1,882,567	2,136,597	2,012,204	2,432,629	2,638,689	3,380,955	3,173,100	3,093,782
Live animals other than for food	1,537	71,878	37,314	9,919	-2,115	10,596	-10,709	-22,667
T O T A L	30,496,710	31,505,084	31,173,951	29,264,846	33,859,085	38,367,557	40,471,915	41,664,533
TOTAL NET IMPORTS	145,419,899	144,806,828	123,478,143	116,610,242	147,293,882	176,748,890	198,169,475	219,731,684
PERCENTAGE	20.97	21.76	25.25	25.10	22.99	21.71	20.42	18.96

a/ Provisional

CHAPTER III
RESEARCH DIVISION
ORGANISATION

1.

The research section of the Ministry consists of a Principal Agricultural Officer (Research) and a team of Specialist Officers. This team consists of an Entomologist, Plant Pathologist, Economic Botanist, Soil Surveyor, three Chemists, two Agricultural Engineers, a number of Agricultural Officers working on different crops, as well as a number of Agricultural Assistants. The United Nation's Rice Geneticist also continued to serve in the research section.

The research work of the Ministry is conducted mainly on the following stations although from time to time, some research work is done on farmers' holdings and on Land Development Scheme.

- (i) The Central Agricultural Station situated on the coastlands some ten (10) miles from Georgetown, is the main research station of the Ministry. It consists of some 1,000 acres under pasture and crops. The three main soil types of the coastlands are represented on it. Laboratory facilities for all the Specialist Officers are available on the station. Most of the research work on rice is done on this station and investigations are being carried out on pests, diseases, soils and new crops (soya beans, irish potatoes, cabbages, onions, sorghum, maize, etc.) and the established crops (coconuts and citrus). Propagation of coconuts and fruit plants is also done on this station.
- (ii) The Central Horticultural Station, situated at Atkinson Field on the right bank of the Demerara River some twenty-five (25) miles from the Coast, is engaged primarily in the production of citrus, cocoa and black-pepper plants for sale to farmers, but investigations with perennial crops such as cocoa, coffee, citrus, blackpepper, oil palm, pineapples and bananas are also being carried out. Recently, some work has commenced on the annual crops, e.g. corn, sorghum, soya bean, ginger and tumeric.
- (iii) Ebini Crop Station this station is located on the brown sands of intermediate savannahs on the right bank of the Berbice River some 60 miles from the coast. The investigations being carried out on this station are aimed at determining the crops or varieties of crops that can be grown under prevailing conditions and secondly, the type and quantity of fertilisers needed for optimum growth. The crops which have been investigated or are being investigated include peanuts, cotton, soya beans, sorghum, corn, mung, sweet potatoes, tomatoes, onions, cashew, coconuts, citrus, pineapple, oil palm and grasses.
- (iv) Wauna Research/Demonstration Plot This plot which serves as a research demonstration plot is situated in the North West District on the red-yellow podzolic soils with deep intense humus incorporation. Investigations are being undertaken with perennial crops such as coffee, coconuts, citrus, avocado, pineapples and with the annual crops, peanuts, sweet potatoes and grasses.

- (v) The Long Creek Research Plot was established during the year on the white sands along the McKenzie/ Atkinson Highway to determine the crops which can be grown economically on the white sands. So far some twenty (20) acres have been planted with pineapple, citrus, cashew, lemon grass, legumes and pasture grasses.
- (vi) Black Bush Research Plot this plot of some forty (40) acres is being utilised to investigate the mechanised aspect of corn production as well as the crops which can be rotated with corn.

II. PRODUCTION AND DISTRIBUTION OF PLANTING MATERIAL

Rice

Foundation seeds of the rice varieties Blue Belle, B.G. 60/44 and No. 79 were produced during the 1968 spring and autumn crops for distribution to the Pure Line Padi Schemes and to selected farmers. The total production for the year was 64,652 lbs Blue Belle, 19,090 lbs B.G. 60/44 and 3,080 lbs No. 79. From this, 25,586 and 7,890 lbs of Blue Belle and 60/44 respectively were distributed.

At the end of the year approximately twelve (12) acres were sown to Blue Belle at the Central Agricultural Station, and six (6) acres at Mahaicony Sub-station for the 1969 Spring Crop.

Nurseries were also sown at the Central Agricultural Station for the transplanting early in the new year of the following varieties:-

B.G. 60/44	-	4½ acres
D 110	-	7 acres
B.G. 60.282	-	10 acres

Coconuts

Selected nuts for propagation were purchased from Cane Grove, Springhall, Chapman's Grove, Orange Nassau East and West. A total of 195,300 nuts of the "tall" types were purchased for propagation at the different nurseries as follows:-

Central Agricultural Station	92,900 nuts
No. 63	27,600 "
Whim	25,500 "
Hosororo	12,000 "
Charity	9,000 "
Suddie	26,000 "
Bartica	2,350 "
Interior	2,350 "

Some 3,617 dwarf nuts were also purchased from Cane Grove, Pln. Park, Sophia's Hope, Cove and John and Zeelandia. All these were sown at the Central Agricultural Station.

A total of 71,261 seedlings of the tall and the dwarf types were distributed from the Central Agricultural Station as follows:

	<u>Tall</u>	<u>Dwarf</u>
Berbice	9,985	300
East Demerara	42,833	225
West Demerara	8,440	248
Miscellaneous	8,336	894
	<u>69,594</u>	<u>1,667</u>

Citrus

The only nursery attached to the research section which is concerned with the production of citrus plant is that at the Central Horticultural Station, Atkinson Field. Production of the various types of citrus plants at this nursery has been greatly expanded to meet the great demand for plants. In 1968, 74,183 orange, 18,594 grapefruit, 11,880 tangerine, 34,411 rangpur lime, 7,688 rough lemon, 150 shaddock and 180 citron plants were propagated. Sour orange continued to be used as the main rootstock for sweet orange whilst rough lemon and rangpur lime were used as rootstock for limes. Only trees certified free of Tristeza are being used as sources of budwood.

The distribution of budded plants to the districts for sale to farmers from this nursery was as follows:-

<u>District</u>	<u>Orange</u>	<u>Tangerine</u>	<u>Grapefruit</u>	<u>Lime</u>	<u>Others</u>
Berbice	6,856	175	484	1,653	-
East Demerara	7,333	883	967	432	63
West Demerara	2,727	577	489	297	-
Essequibo	1,446	100	612	50	-
Total	18,362	1,735	2,552	2,432	63

During National Tree Planting Week July 20-27, 1,300 orange, 541 lime and 1,200 grapefruit plants were distributed free.

Cocoa

The propagation of cocoa plants was at a virtual standstill and only 214 plants were distributed mainly to Essequibo. Ripe pods from the fields at the Central Horticultural Station were collected and prepared beans sold to the Guyana Marketing Corporation.

Coffee

One hundred and twenty Robusta plants were propagated and sent to the North West District.

Blackpepper

A total of 868 blackpepper plants was distributed during the year as follows:-

East Demerara	-	666 plants
West Demerara	-	112 plants
Essequibo	-	90 plants

Fruit Plants

The propagation of the various types of fruit plants for distribution mainly during National Tree Planting Week was done both at the Central Agricultural Station and the Central Horticultural Station. A total of 24,859 fruit plants was distributed from the two nurseries. Among the fruit plants propagated and distributed were avocado, cashew, cherries, mangoes, sapodillas, star apples, genip, papaw, malaka apple, sugar apple, golden apple, guava, psydium, pomegranite, dunks, bilimbi, carambola, custard apple, granadilla, etc.

Ginger and Tumeric

Approximately an acre was put under ginger and tumeric at the Central Horticultural Station for the production of planting material for distribution to farmers.

Blackeye

As in previous years, the demand for blackeye seeds greatly exceeded the supply. A total of 4,797 lbs of seeds was distributed as follows:

Berbice	-	1,700 lbs.
Demerara	-	1,483 "
Essequibo	-	880 "
N.W.D.	-	420 "
Miscellaneous	-	314 "

Practically all of the seeds distributed were imported from California, U.S.A.

Corn

Because of the demand for hybrid corn seeds, the production of seeds of the local variety Charity was curtailed. Only 500 lbs of seeds of this variety were produced and distributed. Hybrid corn seeds, mainly X 304, were imported from the Pioneer Seed Company, Jamaica and by the end of the year, the following amounts were distributed:

Berbice	-	524 lbs
Demerara	-	355 lbs
Essequibo	-	800 lbs
North West District	-	2,376 lbs
Rupununi	-	312 lbs
Experimental and Demonstration purposes	-	2,782 lbs

Cabbage

In 1968, only twenty-one (21) lbs of cabbage seeds were distributed to the districts as compared with over one hundred and thirty (130) lbs in the previous year. The varieties distributed were mainly Stein's Flat Dutch and Copenhagen Market. Small quantities of seeds of the O.S. Cross (hybrid) which have given good results in recent trials have also been distributed.

The commercial production of cabbages was done at the Central Agricultural Station and some 13,000 lbs of cabbages were sold mainly to the Guyana Marketing Corporation.

Onions

As in previous years, very little interest was shown in the cultivation of this crop. Only fourteen (14) lbs of seeds were sold or distributed for demonstration purposes. The main commercial varieties were Crystal White Wax and Yellow Bermuda but seeds of some of the newly introduced varieties e.g. Early Texas Grano 502, Tropicana Hybrid, Yellow Creole, San Felipe were also distributed.

Peanuts

During the year, some 1,545 lbs of peanuts were sent to the district for sale or free distribution. The varieties being distributed are Virginia Bunch and AK 62. The seeds of Virginia Bunch were produced at the Central Agricultural Station and AK 62 at the Ebini Crop Station.

Miscellaneous Crops

Small quantities of different peas and beans e.g. mung, dwarf pigeon peas, red peas, Brazilian peas, Urid, etc., were also distributed to farmers. The production of all of these was done at the Central Agricultural Station.

Seed potatoes and slips of the newly introduced cultivars of sweet potatoes were given out to selected farmers.

III

PESTS AND DISEASES AND THEIR CONTROLRice

The major pests of rice during the year were the padi bug (Oebalus poecilus), armyworm (Spotoptera frugiperda) water weevil (Helodytes favoelatus) and snails (Pomacea spp.). The padi bugs were controlled by dusting with 6.5 gamma BHC, 5% malathion and 5% ~~Sevin~~. Aerial spraying was also carried out in the Mahaicony-Abary area using 1 lb Sevin 85% S.P. in 5 gallons of water per acre with excellent results. Outbreaks of armyworm were controlled with Dipterex and Dieldrin sprays. Seed treatment with Aldrin or Merlane was used for water weevil control. Baylucid and Copper Sulphate at 1 lb and 5 lbs per acre respectively controlled the snails which attacked the young plants.

Blast (Piricularia oryzae) was the only serious disease of rice. Over 5,000 acres of rice in Essequibo Coast and Island, East Bank Demerara, Mahaicony and Mahaica Creeks, East Bank Berbice and Black Bush were affected by the disease. Verdesan (organo-mercury compound) was used to combat the disease.

Under the Rice Pest and Disease Programme which is financed by the Guyana Rice Marketing Board, 237,322 lbs and 1,007 gallons of insecticides were distributed for sale to farmers.

Coconuts

The coconut caterpillar (Brassolis sopharae) caused considerable damage to palms along the coast of Demerara and Berbice. Campaigns for the eradication of the pest were carried out in villages between Mahaicony and Georgetown by the Ministry. A number of persons was employed to climb the trees, cut the affected branches and destroy the caterpillars. Other pests which caused some damage were Castnia daedalus, Strateagus aloeus and Aspidiotus destructor.

Budrot (Phytophthora palmivora), red-ring and bronze leaf wilt were the diseases which were observed in coconut cultivations.

Cocoa

Blackpod (Phytophthora palmivora), Witches' broom (Marasmius perniciosus), Green point gall (Fusarium rigidiuscula) and Cherelle wilt were observed in all cocoa cultivations in the country. Practically nothing was done by farmers to control the diseases.

Citrus

Scab (Elsinoe fawcetti), Gummosis (Phytophthora citri and P. parasitic) caused some damage to citrus in the North West District, and along the banks of the Demerara and Berbice River. Copper sprays were recommended for control of scab and tree surgery, painting with copper and sanitation were the control measures advocated for Gummosis. Suspected cases of Tristeza were observed in the North West District and in Demerara and Berbice rivers. Resistant rootstocks are being recommended for these areas. The main pests observed were scales and aphids (Toxoptera sp.). Gusathion and Albolineum are being recommended for control of the scales and Malathion and dimethoate for aphids.

Corn

With the expansion of corn cultivation much more attention was paid to control of corn pests. The pests observed on this crop were armyworm (Spodoptera frugiperda) stem-borers (Diatraea saccharalis) and aphids. Dipterex applied as a spray and in the granulated form gave excellent control of the armyworm whilst malathion and dimethoate controlled the aphids. Chemical control was not used against stemborers.

Vegetables

The main pests of vegetables observed during the year were leaf-miners (Liriomyza sp.) on all crops, aphids (Lipaphis erysimi) flea beetles (Epitrix sp.), budworm (Hellula phidealis) on cabbages, crickets and spider mites. The leaf miners were controlled with dimethoate, aphids with malathion, flea beetles with Sevin and budworm with Dipterex.

The leaf diseases, late blight (Septoria apii), white rust (Albugio candida) were found on celery, carrot and packchoi. Blue Cupravit, 2 ozs per gallon of water applied weekly is the chemical presently being recommended for the control of this disease. Bacterial wilt (Pseudomonas solanacerium), early blight (Alternaria solani), root knot (Meloidogyne incognita) and blossom end rot were the most serious diseases of tomatoes.

Banana

Moko (Pseudomonas solanacearum), Panama (Fusarium oxysporium var. cubense) and Sigatoka (Cercospora musa) diseases were found in the North West District, Pomeroron, East Bank Essequibo and Berbice River. Spraying with oil (one gallon per acre) was recommended for control of Sigatoka.

Peanuts

Early and late blights (Cercospora arachidicola and C. personata) were observed on peanuts in different parts of the country. Control measures for these diseases are being investigated.

Acoushi Ants

The campaign for eradication of the pest was carried out in Berbice River, West and East Coast Demerara, Upper Demerara River, North West District, Bartica and Interior, Essequibo Coast and Islands and the Rupununi districts. Reports from the districts indicated that 5,403 nests were destroyed and some 158 gallons of aldrin, 99 gallons of gasolene and 2,157 lbs of Mirex 450 bait utilised in the campaign. Mirex bait was used extensively during the dry season and aldrin applied as a fog with the swing-fog machine during the wet season. Funds for this campaign were provided by the Freedom from Hunger (U.K.) Committee and during the year \$4,517.39¢ were spent on wages, insecticides, fuel, etc.

A special campaign was conducted in the Berbice River with funds from U.S.A.I.D. Approximately \$10,000 were spent and over 2,000 nests destroyed. Mirex was used exclusively.

Disinfestation of Rice Mills

The disinfestation of rice mills and bonds throughout the country was carried out between March and April and again between September and November. This operation was carried out jointly by the Entomology Division staff and the District Supervisors of the Guyana Rice Marketing Board which also financed the operation. Two hundred and six (206) of the privately owned mills were cleaned and sprayed with insecticides.

One hundred and twenty (120) gallons of Malathion E.C., 602 lbs Malathion 25% W.P., 1,080 lbs Lindane 26% W.P., and 5,470 lbs Malathion 5% dust were used in the exercise.

Storage Pest Control

Methyl bromide fumigation of 4,400 lbs wheat and corn meal was carried out at the World Food Programme, School Feeding and Red Cross bonds. Phostoxin fumigation of seed padi was done at the Cane Grove and Anna Regina Pure Line Seed Bonds.

Regular visits were made to the Rice Development Corporation mills at Anna and M.A.R.D.S. to advise and assist in the control of storage pests.

Quarantine

The fumigation of 3,261 tons of rice bran and 11,120 tons of rice for export were supervised and the necessary certificates issued. A total of twenty (20) ocean going vessels and thirty-six (36) sloops were examined.

Phytosanitary certificates were issued for plant material, etc.

IV

SOIL SURVEYS

Soil Surveys were done in 1968 of the following areas:

- A. Boeraserie West (Good Hope to Lookout)
- B. Tumatumari
- C. Siriki backlands (Pomeroon)
- D. Arakaka, N.W.D.
- E. Tiboku Trail, Mazaruni River.

A. Boeraserie West (Good Hope - Lookout area)

The soil investigation in the Goodhope - Lookout area on the East Bank of the Essequibo River covered approximately 6.4 square miles.

Seven kinds of soils were identified and mapped in this area. These are developed from recent alluvial deposits (riverain) and organic deposits (muck and peat).

1. Warima silty clay	604 acres
2. Naamryck Pegasse 12" to 36"	1,056 "
3. Naamryck Pegasse 36" to 60"	776 "
4. Hubu Pegasse burned phase	3,431 "
5. Uitvlugt Pegasse burned phase	2,484 "
6. Salem Pegasse burned phase	271 "
7. Salem Pegasse 12" to 36" peat	2,230 "

95% of the area comprise soils of an organic nature and a characteristic feature of the entire area is poor and/or impeded drainage.

B. Tumatumari

This area comprising 1,520 acres is situated on the right bank of the Potaro River and is approximately 2 $\frac{1}{2}$ miles East of the Tumatumari Falls. The actual study extended from Tiger River, a tributary of the Potaro River to the mouth of the Potaro River.

The entire area is under forest except for a small area of brown sand which is planted with cassava. The main forest types are Wallaba, Clump Wallaba, Mora and scattered Greenheart.

The soils of approximately 96% 1,447 acres, of the area are moderately well suited for agricultural development (Land Capability Class II) and are recommended for development. These soils, given adequate irrigation and above average management (including the application of fertilisers) will give satisfactory yields of citrus, avocado pears, bananas, plantains, pineapples and adopted ground provisions. The remainder of the soils show little agricultural potential and therefore are poorly suited for crop production. However, with special water control and intensive practices, these soils could be used for few crops.

The soils identified in this area are well drained yellowish brown sandy loam (Red Yellow Latosol), unit 810; an excessively drained white sand (Regosol), unit 700; a poorly drained silt loam (Low-Humic Gley - Ground water Laterite) unit 157; and a Miscellaneous Land Type, unit 766. The Brown Sands and White Sands occur on terraces as high as 50 feet above the present flood water level of the Potaro River. The silt loam is subjected to seasonal flooding.

The 1,520 acres investigated gives the acreage of each kind of soil as follows:

<u>Unit</u>	<u>Name</u>	<u>Acreage</u>	<u>Land Capability Class</u>
157	Potoco silt loam	936	II
700	Tiwiwid sand	60	III
766	Mixed alluvial	13	IV
810	Kasaramalloamy sand	570	II

C. Siriki backlands (Pomeroon)

This area covers 5,353 acres and consists partly of well drained yellowish brown sandy loam (unit 810,570 acres). This soil has brown sandy loam surface over a brown friable sandy clay loam subsoil. It is well suited for orchard crops, vegetables, pineapples and moderately suited for pasture; ground provisions and peanuts.

The remainder of the soils, the very poorly drained organic soils developed in depressions (unit 60); the excessively drained Regosol (white sands) developed in coarse sediments (unit 700); the very poorly drained Low-Humic Gley soil developed in sandy sediments (unit 730) and the excessively drained Regosol (Brown sand) are either poor of plant nutrients or too low in relief and therefore poorly suited for agriculture.

<u>Unit</u>	<u>Name</u>	<u>Acreage</u>	<u>Land Capability Class</u>
600	Lana muck	2,104	IV
700	Tiwiwid sand	1,656	III
730	Henrietta sand	405	IV
800	Tabela sand	618	III
810	Kasarama loamy sand	570	II

D. Arakaka, N.W.D.

This survey was carried out in the vicinity of Arakaka and Eclipse Fall, Barima River where 2,051 acres of land were investigated. This was not one continuous block but in three blocks with acreages as follows:

Block A	-	481 acres
Block B	-	1,020 "
Block C	-	550 "

The most extensive soil is the Barima silt loam (unit 370). It occurs throughout Block A and on the flats of the Arakaka Creek and Manikuru River in Blocks B and C respectively.

Arakaka silt loam (unit 360) and Kaituma silt loam (362) occur in Block C on slopes of 5 - 25%.

E. Black Bush Polder

Black Bush Polder was surveyed in 1955. Guyana Soil Survey has since been established and is in the process of setting up a national soil legend. The soils in Black Bush Polder have now been tentatively correlated.

F. Tiboku Trail (Reconnaissance survey)

Soils consists mainly of Red-Yellow Podzolic, Red-Yellow Latosols, Reddish-brown Lateritic and Regosols.

The Regosols, deep white sands, have slopes that are mostly gentle but some of the sides of valleys are steeper than 20 %. The remainder of the soils are on more hilly areas and with more steeper slopes.

The deep white sands have little potential for economic agricultural production, although some crops could be grown in well watered places if all the plant nutrients were supplied. Caribbean pines and Wallaba could grow well. Some areas with deep, brown sands with some clay in the subsoil have good physical properties and if given the management will produce many annual crops, tree crops and pastures of high carrying capacity. Most of the area contain hilly or rolling loamy soils on deeply weathered, mostly light coloured, acidic rocks and some areas have reddish clay soils that contain ironstone boulders or gravel.

The Red-Yellow Podzolic, Red-Yellow Latosols and Reddish-Brown Lateritic soils have good potential for agricultural development. Control of runoff and erosion and above average management, including the application of fertilisers, are essential for continued crop production.

V. RESEARCH

The results of experimental work are briefly summarised in this section of the report. In Volume II of the Research Report now being prepared, the research work will be written up in greater details and only established scientific lines.

A. Soil and Soil Fertility Studies

(a) Laboratory Studies

(i) Phosphorus fixation studies:

The study of the fate of applied phosphorus on a number of the more important soil types of the interior was started. Results for three soils - Tiwiid fine sand of the 'White Sand' series, Tabela sand and Kasarama loamy sand of the 'Brown Sand' series - are given below. Phosphorus was applied at the rate of 50, 100 and 150 lbs. P per acre to limed (pH ca 6.5) and unlimed portions of soil kept at 80% W.H.C. Available phosphorus was measured at intervals over 12 weeks by the methods of Osen, Bray and Truog.

Results show that the Kasarama and Tabela soils have a high phosphate fixing capacity and the Tiwiid soil a low phosphate fixing capacity. For all soils the rate of decline in concentration of available P was rapid over the first two weeks, but then decreased. Liming had no effect on this general pattern.

There was no indication that the rate of applied phosphorus had any consistent effect on the percentage recovery of applied phosphorus. For the Tabela and Kasarama soils lime generally reduced the percentage of applied P recovered when measured by Olsen and Bray's method. For the low phosphorus fixing Tiwiid soil, the percentage of phosphorus recovered by the Truog method was always greater than by the Bray and Olsen methods. The

reverse was true for the Tabela and Kasarama soils. It was suggested that the mechanism of fixation differs for these two categories of soils.

These studies indicate that it is advisable to apply relatively small but frequent doses of phosphorus for optimum plant use.

(ii) Lime Requirement Studies:

A study of the lime requirement of some of the major soil types of the area was started. The method used was that of Hardy and Lewis (1929). The method gave quite consistent and repeatable results except where the soil had a high organic matter content. This was probably due to sample variability. As expected the quantity of lime required to bring the soils to a pH ca 6.5 increased with the fineness of the texture of the soils.

Manganese Toxicity:

Determination of exchangeable manganese (extracted with N ammonium Acetate) was done on soil samples taken from the Matthews Ridge - Kaituma Area, an area earmarked for intensive agricultural development. These soils had pH's ranging from 4.5 to 5.3.

Soils taken from two locations had concentrations of 18 and 32 ppm exchangeable manganese in the top six inches. These levels are greater than levels suggested to be toxic to plants. In 1969, work will be done to determine the critical levels for a few of the major crops to be grown in the area.

(b) Greenhouse Studies:

Late in 1968, a series of pot studies was begun to assess the fertility status of the more important soil types of the interior of Guyana. Priority was given to those soil types that occupy large acreages and/or are in areas earmarked for agricultural development in the near future.

The experiments were of a 3^3 N.P.K. factorial design with N.P.K. confounded. The treatments were

Nitrogen	$n_0 = 0$ ppm N
(applied as ammonium sulphate)	$n_1 = 25$ ppm N
	$n_2 = 50$ ppm N

Potassium	$k_0 = 0$ ppm K
(applied as Potassium chloride)	$k_1 = 15$ ppm K
	$k_2 = 30$ ppm K

Phosphorus - the rates, varied with the soil type, depending on its phosphorus fixing capacity.

Corn (Zea mays) was the indicator crop. The plants were harvested at six weeks and yields recorded. The yield results (after one harvest) for three soils are summarised. Nutrient uptake results will be presented later.

(i) Tiwiwid fine sand:

Highly significant responses were obtained by the addition of nitrogen and potassium. The linear component of these responses were significant. No significant yield increase was obtained by adding phosphorus. The increase in yield caused by raising the level of nitrogen from n_0 to n_1 or from n_1 to n_2 were not significant; it was however significant; (5%) between n_0 and n_2 . Increases in yield due to potassium were significant at the 5% level between both k_0 and k_1 and k_1 and k_2 . Examining the simple effects it was found that increasing the rate of nitrogen from n_0 to n_1 did not give significant yield responses at all levels of potassium, however when nitrogen was increased from n_1 to n_2 yields increased significantly (5% level) at the k_1 and k_2 levels of potassium. Increasing nitrogen from n_1 to n_2 at the k_0 level just failed to have a significant depressing effect on the yields; this depressing effect was due to lodging of the plants in the n_2k_0 pots. It was also found that increasing potassium from k_1 to k_2 caused a highly significant (1% level) increase only at the n_2 level of nitrogen, and that increasing from k_1 to k_2 caused significant responses at all levels of nitrogen. Although the main effect of phosphorus was not significant, examination of the simple effects showed that significant (5% level) were obtained by increasing the rate of phosphorus from p_0 to p_2 at the n_2 level of nitrogen.

These results indicate that for maximum plant growth on the Tiwiwid soil the optimum levels for fertilization will be nitrogen, 50 ppm N, Potassium - 30 ppm K; and phosphorus 50 ppm P.

(ii) Ebini sandy loam:

A significant (5% level) response was obtained by the application of phosphorus. Neither potassium nor nitrogen gave any significant increases in yield. The linear components of the nitrogen and phosphorus were significant (5% level). A significant increase in yield was obtained by increasing the level of phosphorus from p_0 to p_1 but not from p_1 to p_2 . Examining the simple effects, the main findings were that increasing the rate of nitrogen from n_0 to n_2 at the p_2 level of phosphorus caused a significant (5% level) increase in yields; the yields caused by increasing phosphorus from p_0 to p_1 was significant at the n_2 level of nitrogen and just failed to be significant at the n_1 level.

From these results the indications are that for maximum plant growth on Kasarama loamy sand the optimum rates of fertilization will be nitrogen, 50 ppm N; phosphorus, 62.5 ppm P; and no potassium.

(iii) Brickery clay:

Phosphorus caused a significant (5% level) increase in yield. Responses to nitrogen and potassium were not significant. The response to phosphorus was linear. Examining simple effects, it was found that increasing phosphorus from p_0 to p_2 caused a

significant (5% level) increase in yield only at the n_2 level of nitrogen.

These results indicate that for maximum plant growth on Brickery Clay the optimum fertilizer rates are nitrogen, 50 ppm N; phosphorus, 125 ppm P and no potassium.

(c) Field Experiments

(i) NPK Fertilizer Experiment with Corn (*Zea mays*) var. Pioneer 306 at Central Agricultural Station.

A 3^3 NPK factorial experiment with two replications and with NPK confounded was carried out during the long wet season, 1968. The experiment was located on the soil type Onverwagt clay to silty clay. The treatments were as follows:

Nitrogen (applied as Urea)	n_0 - no nitrogen
	n_1 - 60 lbs N per acre
	n_2 - 90 lbs N per acre
Potassium (applied as potassium chloride)	k_0 - no potassium
	k_1 - 60 lbs K_2O_5 per acre
	k_2 - 120 lbs K_2O per acre
Phosphorus (applied as triple superphosphate)	p_0 - no phosphorus
	p_1 - 30 lbs P_2O_5 per acre
	p_2 - 60 lbs P_2O_5 per acre

The nitrogen and potassium fertilizers were split into two equal parts and applied at planting and 40 days after, following customary practise. The phosphorus was all applied at planting. Yields as dry cobs were recorded for each plot.

Significant main factor - N, P and K and two factor interactions were obtained. The overall increases in yield of corn caused by increasing nitrogen from 0 to 90 lbs N per acre, phosphorus from 0 to 60 lbs P_2O_5 per acre, and potassium from 0 - 120 lbs K_2O per acre were 2,728, 300 and 592 lbs per acre respectively. Examining simple effects the main findings were that at the n_2 level of nitrogen no significant increases in yield were obtained by increasing K from k_1 to k_2 and that the k_2 level of potassium no significant increase in yield was obtained by increasing nitrogen from n_1 to n_2 .

These results indicated that for maximum yields of Pioneer 306 on Onverwagt clay/silty soil the rate of fertilization should be nitrogen, 90 lbs per acre, phosphorus, 60 lbs, P_2O_5 per acre and potassium, 60 lbs K_2O per acre.

(ii) Field experiments in progress

Field experiments initiated during 1968 for which results are not yet available or where available statistical analyses are not completed, are listed below.

At Long Creek (soil type: Tiwiwid fine sand) with Pangola grass, Digitaria decumbens (Stent) as the crop.

- (1) A 3^3 NPK factorial to determine the effects of nitrogen, phosphorus and potassium singly and in combination on the yields of grass.
- (2) A 3^2 factorial experiment with magnesium and fritted trace elements, to determine the effects of these fertilizers singly and in combination on grass yields.
- (3) Fertilizer experiment comparing the effects of urea and ammonium sulphate as nitrogen sources.
- (4) Fertilizer experiment comparing the effects of lime on rock phosphate and triple super phosphate as sources of phosphorus.
- (5) Fertilizer experiment comparing a sparingly soluble form of potassium and magnesium with readily soluble forms. At Ebini (soil type: Kasarama loamy sand) Crop: grass, Digitaria

decumbens

- (1) Fertilizer experiment comparing urea and ammonium sulphate as nitrogen sources and the effect of the nitrifying inhibitor 'Toyo Koatsu-AM' on them.
- (2) 2^5 Factorial Experiment with nitrogen, phosphorus, potassium, lime and magnesium to determine the effect of these nutrients singly and in combination on the growth of grass, Digitaria setivalva.

The following crop/fertilizer studies were initiated at the start of the November/December rains.

Rice, Oryza sativa var. Blue Belle.

- (1) Experiment for determining the most suitable source, method and time of application of nitrogen fertilizers, located at Rice Station, Mon Repos,
- (2) 3^3 NPK factorial experiments to determine the effects of nitrogen, phosphorus and potassium singly and in combination. Located at Mahaicony Abary Rice Development Scheme.

Corn, Zea mays var. Pioneer X-304

- (3) Experiment with four levels of nitrogen and two levels of phosphorus to determine the requirement of nitrogen and phosphorus by corn. Located at Mon Repos, Black Bush Polder and with slight modifications at Central Horticultural Station, Atkinson.

Soybeans, Glycine max var. Arcadian.

- (4) Randomised block design experiment to investigate the NPK requirements of soybean. Located at Mon Repos and Atkinson (C.H.S.)

B

Plant Pathology(a) Leafscald ratings of sugar cane

One hundred and fifty five (155) varieties of sugar cane were tested in the field at the Central Agricultural Station for their resistance to Leafscald disease. Forty five (45) of the varieties were rated as resistant, sixty one (61) as moderately resistant, eight (8) tolerant, twenty (20) susceptible tolerant and twenty one (21) susceptible.

Eighty (80) other varieties under test have not yet been rated.

(b) Cross inoculation studies with leafscald

Cross inoculation studies were carried out to determine whether leafscald can be transmitted to corn, sorghum and pangola grass. Symptoms of the disease were not observed on sorghum or pangola grass. However, symptoms were observed on corn indicating the possible carry over of the pathogen on this plant.

(c) Indexing of citrus budwood

The programme of testing citrus trees for the presence of tristeza virus was continued. Trees at the Central Horticultural Station and the Hosororo Experiment Station used as sources of budwood were tested in the screenhouse by budding unto potted West Indian lime plants. To date 467 trees have been tested, and on eighty one (81) trees symptoms of 'Tristeza' were observed.

(d) International Blast nursery for the Americas

During the autumn crop, one hundred (100) rice varieties or crosses were rated against blast at the Central Horticultural Station. The seeds were received from the U.S.D.A., Beltsville, Maryland. Thirty one (31) varieties were placed in the resistant category, sixty six (66) moderately resistant and three (3) susceptible.

(e) Control of blast disease with fungicides

An experiment was carried out in the autumn crop at Land of Canaan, East Bank of Demerara to compare the effectiveness of four fungicides with Verdesan (standard) in controlling blast disease on rice. The results are shown in the Table below. The variety BG. 79 was used in the experiment, and all of the chemical except Verdesan were applied twice, once before and after flowering.

Chemical	Rate per acre	Yield bags of 140 lbs per acre	% neck infection
Hinosan 50% E.C.	0.5 pint	27.64	12.0
	1.0 "	30.71	10.0
	1.5 "	39.93	5.0
Dithane 45% W.P.	1.0 lb.	18.43	11.0
	2.0 lb.	29.64	7.0
Duter 50% W.P.	1.0 lb.	19.45	12.0
	2.0 lb.	27.64	6.3
Antracol 70% W.P.	1.0 lb.	18.43	13.0
	2.0 lb.	33.78	7.3
Verdesan (0.5, 0.5 and 1.0)		17.40	7.0

Significant increases in yield were obtained from Hinosan at 1.0 and 1.5 pint Dithane M 2.0 lb., and Antracol at 2.0 lb. per acre.

(f) Rating of Soybean varieties

The forty (40) soya bean varieties undergoing tests at the Central Agricultural Station were rated against soybean mosaic.

(g) Control of root knot nematodes in tomatoes

Nemagon and V.P.M. at two rates 0.5 and 1.0 gallon, were tested for control of the root knot nematodes in tomatoes at Ebini. No significant increase in yield resulted from any of the treatment. All of the treatments however, resulted in a reduction of nematodes in the soil, with Nemagon at 1.0 lb. per acre giving 100 percent control.

(h) Experiments in progress

The following experiments are in progress:

- (i) rating of 50 species of grasses against Pangola Stunt Virus.
- (ii) screening of nematocides against root knot of peanuts.
- (iii) evaluation of fungicides against early and late blights of carrots.
- (iv) rating of different carrot varieties against diseases.
- (v) nematocide trial in onions.
- (vi) ratings of sorghum varieties against different diseases.

- (vii) ratings of tomato varieties against different diseases.
- (viii) screening of fungicides against early and late blights in potatoes.
- (ix) ratings of irish potato varieties for resistance to diseases.

C. Entomology

(a) Comptability of the weedicide (Stam F) and insecticides on rice

In view of complaints that burning of rice plants was observed when certain insecticides were applied immediately after the application of the weedicide Stam-F (3, 4 dichloropropionanilide) experiments were initiated to determine the comptability of the weedicide with a number of the commonly used insecticides. Severe scorching was observed on Bluebelle rice plants when the weedicide was mixed and applied with 0.58% trichloron (Dipterex 80% S.P.), 0.58% carbaryl (Sevin 85% S.P.), 0.3% (toxaphene) 0.25% dieldrin (20% e.c.), 0.3% Grodona (25% e.c.), 0.44% endosulphan (Thiodan 35% e.c.). When the insecticides were applied three (3) days after the weedicides, no phytotoxic effect was observed in any of the treatments, indicating that under normal circumstances these insecticides could be applied three (3) days after Stam-F or any of the propanils.

(b) Control of the armyworm (Spodoptera armigera)

Tests were carried out in the laboratory with a number of these to determine their effectiveness in controlling the armyworm. Rice plants were sprayed with the insecticides and the caterpillars introduced on the sprayed plants. Dipterex 80% S.P. at the rate of 1 and 2 ozs., Toxaphene 35% E.C. at the rate of $\frac{1}{2}$ and 1 fl. oz. and Dieldrin 20% at 2 fl. ozs. per gallon of water, all gave 100 percent control of the caterpillars after 24 hours.

(c) Control of crickets (Gryllus fulvipennis) with poison baits

In tests in the laboratory, poison baits made up with four parts of Dipterex 80% S.P. to 96 parts of donkey meal gave 100 percent mortality of crickets after 21 hours, and 4 parts of Pares Green to 96 parts of donkey meal, 100 percent mortality after 48 hours.

(d) Control of paddy bugs (Oebalus poecilus) by aerial application

Observation carried out at Mahaicony/Abary showed that the aerial application of 1 lb of Sevin 85% S.P., in 5 gallons of water resulted in 100 percent control of the paddy bugs after 24 hours.

(e) Control of Stemborers on rice

Two trials were carried out to test the effectiveness of different insecticides for the control of stem-borers during the spring and autumn rice crop. The variety bluebelle was used in both trials. In the first trial, the insecticides, Thiodan, Lebaycid, Cidial, Basudin and Lindane were tested at 0.10% concentrate with one (1) or two (2) applications being made prior to flowering. In the second trial, Lindane, Thiodan, Basudin, Lebaycid, Bidrin, Phosphamidon and Sevidol were used and 2 or 3 applications were made to the plants. Whilst some

reduction in "white heads" were observed in treated plots, none of the treatments gave any significant increase in yields.

(f) Experiments in progress

The following experiments laid down towards the end of the year are now in progress.

- (i) assessment of losses to crops - the crops being studied are corn, sweet corn and paddy.
- (ii) chemical control of pests of paddy.

D Annual Crops

In pursuing Government's policy of crop diversification and the reduction of food imports by local production and substitution, investigations were continued on variety of annual crops. Most of these investigations were done at the Central Agricultural Station but towards year end trials were initiated in the different parts of the country with the more promising crops or varieties.

Irish potato

Trials carried out at the Central Agricultural Station fifteen (15) varieties of potatoes obtained from Holland were compared for yields and resistance to disease. As in previous trials, the variety Patrones gave the highest yields in marketable tubers. Red Pontiac, CB 52-105-9, Arran Banner and Arka were the next best yielders. Towards the end of the year, 30,000 lbs of tubers of these varieties were imported and these were being distributed for trials in different parts of the country.

Sweet Potato

Two trials were conducted during the year with the seven cultivars obtained from the U.W.I. and one from Puerto Rico. In the first trial planted in December 1967, and harvested in April 1968, the following yields were obtained:-

T 67	-	28,226 lbs / acre
T 25	-	24,297 " "
A 26/10	-	23,522 " "
S 128	-	23,232 " "
A 26/7	-	22,744 " "
C 9/9	-	21,986 " "
O 49	-	21,199 " "
Puerto Rico	-	19,360 " "

The second trial planted in May and harvested between October and November, 1968, gave the following yields:-

White Lady (local)	-	15,921 lbs / acre
A 26/7	-	15,834 " "
T 67	-	15,225 " "
S 128	-	13,485 " "
T 25	-	12,180 " "
O 49	-	11,310 " "
C 9/9	-	10,614 " "
Puerto Rico	-	10,266 " "
26/10	-	8,613 " "
Uncle Mack (local)	-	7,308 " "

The local variety White Lady which gave the highest yield in this trial produced tubers which were not uniform in appearance.

Trials with all of these varieties have already been planted and will be harvested early in 1969. Planting material of the more promising varieties are being distributed to farmers.

Onions

Seven varieties of onions obtained from the U.S.A. were compared for yields and storage qualities. The seeds were directly sown in the field at the Central Agricultural Station between 31st December, 1967 and 6th January, 1968. Harvesting of the bulbs was done between 2nd April, 1968 and 23rd April, 1968. The yields obtained were:-

Texas Grano 502	-	46,500 lbs of cured bulbs/acre		
Tropicano Hybrid	-	44,250 "	"	"
Golden Pera	-	38,000 "	"	"
Yellow Bermuda	-	33,500 "	"	"
Eclipse L 303	-	30,250 "	"	"
Red Creole C 5	-	26,000 "	"	"
Yellow Creole	-	25,500 "	"	"

The varieties Tropicano Hybrid, Golden Pera, Yellow Creole and Red Creole had a storage life of 4-5 months, Texas Grano and Yellow Bermuda 2-3 months whilst Eclipse L 303 was the poorest storer of the lot.

Further trials with these and other varieties are being continued. Seeds of the best varieties have also been distributed to the districts.

Cabbages:

Eight (8) varieties transplanted in November, 1967 were compared for yields, period of maturity and size of head. The results are shown below:

	<u>Period of</u> <u>Maturity</u> <u>(days)</u>	<u>Average size</u> <u>of heads</u> <u>lbs.</u>	<u>Yield</u> <u>lbs/acre</u>
O.S. Cross	80-90	2.3	18,867
Stein's Flat Dutch	90-110	1.8	14,220
E.J. Wakefield	75-90	1.3	13,520
Midseason Market	70-80	1.5	12,860
Charlestown Wakefield	85-100	1.4	10,976
Premium Flat Dutch	100-120	1.8	10,856
Copenhagen Market	65-78	1.0	10,666
Golden Acre	60-70	0.7	7,686

Tropical Wheat

Twelve varieties of tropical wheat obtained from India were planted on 2nd December, 1967. All of the varieties gave yields less than 150 lbs per acre and matured in 88-92 days. Further trials with other varieties obtained from Mexico and India, are in progress.

Sweet Corn

Eight varieties of sweet corn obtained from the U.S.A. were compared for yields in trial sown on the 31st May, 1968. The yields were as follows:-

Midway	-	10,070	lbs	per	acre
Golden Security	=	9,650	"	"	"
Winter Green	-	8,525	"	"	"
Golden Fancy	-	8,500	"	"	"
Iona	-	7,750	"	"	"
Calumet	-	7,625	"	"	"
Honey Cross	-	7,525	"	"	"
Golden Cross Bantam	-	6,900	"	"	"

Peanuts

Four (4) varieties of peanuts obtained from Mexico and one from Surinam were compared with the two varieties commonly grown in Guyana, Virginia Bunch and AK 62. The trial was planted on the sandy clay soils at the Central Agricultural Station on 24th June, 1968. The varieties AK 62 and Surinam matured in 119 days and the other in 140 days. The yields in sundried nuts (13% moisture) were:-

Virginia Bunch	-	2,010	lbs	per	acre
Decieras 1	-	1,963	"	"	"
Decieras 2	-	1,628	"	"	"
Rastrea Gigante	-	1,360	"	"	"
Surinam	-	1,340	"	"	"
F.A.O. A.K. 62	-	1,320	"	"	"
RF 211 - N - C - 2	-	1,253	"	"	"

The trial with these varieties are being repeated on the brown sands at Ebini.

Soya bean

The trials with soya beans obtained from U.S.A., Mexico, Australia, Brazil, Venezuela, Philippines, Indonesia, Guatemala, etc. were continued. Two trials were planted during the year, the first on 20th December, 1967 and the second on 17th June, 1968. The varieties which gave the highest yields in the trials were:

	<u>1st trial</u>		<u>2nd trial</u>	
Pelicano	3,253 lbs per acre	203201	1,938 lbs per acre	
222550	3,176 " " "	240667	1,938 " " "	"
Arcadian	2,905 " " "	203406	1,736 " " "	
230201	2,831 " " "	Otootan	1,703 " " "	
Java 16	2,777 " " "	222550	1,688 " " "	
164885	2,686 " " "	Arcadian	1,676 " " "	
240826	2,432 " " "	285097	1,594 " " "	
200515	2,178 " " "	247678	1,547 " " "	
240664	2,160 " " "	L 2006	1,438 " " "	
285097	2,147 " " "	240663	1,406 " " "	
L 2006	2,123 " " "	240826	1,375 " " "	

Further trials with the varieties which have consistently given high are being carried out on different soils at the Central Agricultural Station, Central Horticultural Station and Black Bush.

Garlic

Four varieties of garlic obtained from Mexico and two from California, U.S.A. were planted at the end of the year to determine their adaptability to local conditions.

Sorghum

Two trials were carried out at the Central Agricultural Station with a number of hybrids obtained from the U.S.A. and the open pollinated variety Kaura from Africa. Heavy and continuous rain soon after seeding seriously affected the plant stand and consequently yields were poor. Birds also caused considerable damage and the variety Kaura was totally destroyed. The yields from the two trials were:-

	<u>1st Trial</u>
NK 222 A	2,051 lbs per acre
NK 275	2,060 " " "
NK 222	2,043 " " "
NK 212	2,021 " " "
Amak Rio	1,043 " " "

	<u>2nd Trial</u>
BR 62	1,071 lbs per acre
BR 64	708 " " "
Pioneer 848	708 " " "
" 820	701 " " "
" 845	604 " " "
Amak Rio	604 " " "
Pioneer 828	507 " " "
" 846	507 " " "
F 64	500 " " "
Pioneer 866	403 " " "
E 57	306 " " "

Further trials with these and other varieties are now in progress.

Corn

The commercial trials at Black Bush to work out the economics of corn production and techniques for mechanised production were continued at Black Bush. Two crops were harvested in 1968 and the third will be harvested early in 1969. The first was planted in December, 1967 and harvested between March and April, 1968. In this trial the seeds were sown with a multi-purpose grain drill and as a result, there were considerable variation in plant stand. The yields, as a result, were rather low, averaging 1,538 lbs per acre of shelled corn (12% moisture) per acre. The second trial was sown in May with a two row corn planter and harvested during October. The yields over the 40 acre block averaged over 2,500 lbs of shelled corn per acre. Harvesting of both crops was done with a one-row corn picker husker. The Pioneer hybrids X 304, 306 and 302 were used in the trials.

The cost of production per acre for the two (2) crops was as follows:-

	<u>1st Crop</u>	<u>2nd Crop</u>
Land Clearing	\$ 97.13	\$
Land Preparation	10.55	17.62
Liming	36.42	
Planting	21.88	12.85
Fertilisation	14.49	53.71
Weed Control	10.23	22.40
Pest Control	15.50	14.33
Harvesting	12.93	11.74
Husking, drying and shelling	37.52	9.13
Irrigation	-	3.25
Watching	40.49	44.25
	<hr/>	<hr/>
	\$ 297.04¢	\$ 189.25¢
	<hr/>	<hr/>

Seeds of the hybrids were made available to Bookers, the Guyana Development Corporation and selected farmers for trials. In all these trials, satisfactory results were obtained with the hybrids and with X 304 in particular. The yields from these trials, even in some cases without fertilisers, varied from 3,000 lbs to 5,600 lbs per acre.

As a result of the satisfactory results obtained with X 304, trials were initiated to find out the optimum spacings for maximum yields. Three row spacings 24, 30 and 36 inches and three (3) inter-row spacings 9, 12 and 15 inches are being compared. This trial will be harvested early in 1969. Fertiliser trials have also been started with this hybrid to determine its fertiliser requirements when grown on different soil types. Three trials are in progress, at the Central Agricultural Station, Central Horticultural and Black Bush. Others will be started in the new year.

Three new hybrids X 306 A, X 332 and X 348 were received from the Pioneer Hybrid Seed Company, Jamaica and these are being compared with X 304, the local variety Charity, and one obtained from Venezuela, the variety Oregon.

E. PERENNIAL CROPS

Pineapples

During the year, 14,000 suckers of the variety Smooth Cayenne, the variety used most extensively in the canning industry, were imported from Martinique. Plots of this variety, together with the local variety, Monsterrat, with which it is being compared, have been established at Ebini (brown sands), Long Creek (white sands), Wauna (red-yellow podzolic soils) and Atkinson Field (pegasse soils). Fertiliser trials with these varieties are also being conducted on the different soils.

The observation plots of the different "types" of pineapples collected locally were maintained at the Central Horticultural Station, Ebini and Central Agricultural Station. Records of the yields, size of fruits, period of maturity and quality of the fruits are being kept. The promising types will be selected out for multiplication and further trials.

Oil Palm

The trial plots of the different varieties of oil palms at the Central Agricultural Station and Central Horticultural Station were maintained. Observations are being made on growth and subsequently, of flowering and yields. The plots at the Central Horticultural Station which were established in 1967 on the organic soils have made very rapid growth. Whilst it is too early to draw any conclusions, the indications are that this crop may be suitable for these areas where coconut cannot be grown.

One new plot was established at Ebini where three blocks have been planted with the varieties, Dura/Deli (Surinam), 8/1, Dura/Deli (Surinam) 12/2, and Del Pisifera (Nigeria).

Citrus

The rootstocks of Orlando Tangelo, Cleopatra Mandarin, Troyer Citrange, sweet orange, rough lemon, sour orange and rangpur lime are being budded with virus free budwood of Marsh grapefruit and Valencia orange obtained from Florida. Early in 1969, the rootstock trials with these different rootstocks would be laid down on different soils where citrus can be grown.

Fertiliser trials on citrus are presently being carried out on the white sands (Long Creek), brown sands (Ebini) and on the red-yellow podzolic soils (Wauna). Other trials will be started in 1969.

Cashew

Seven "types" of cashew (Jack Wheat, Yellow Takatu, Pink Takatu, Yellow Rupununi, Pink Rupununi, Trinidad and Dara) planted on the different soil types at the Central Horticultural Station are being observed for flowering, fruiting and yields.

Observations have also been established on the white sands at Long Creek and on the brown sands at Ebini.

Cinnamon

Samples collected from the Central Horticultural Station were sent to the Tropical Products Institute. The results of the analysis were not favourable.

F.

EBINI CROP STATION

Peanuts

Previous work at Ebini has shown that peanut is one of the crops suited for cultivation on the brown sands. A five (5) acre commercial trial was, therefore, laid down to work out the economics of peanut cultivation. The trial was planted in June/July and harvested in October. The trial AK 62 (F.A.O. 11899) was used. The yield obtained per acre was 1,469 lbs of sundried nuts of which only 862 lbs were marketable. This was primarily due to the non-availability of gypsum which should have been applied at the onset of flowering. The cost of production per acre was \$435.00, labour inputs amounting to \$285 and materials (fertilisers, etc.) \$150.00.

Two pieces of equipment purchased from a Japanese firm, CeCo Co., were used for the first time in harvesting the trial. One was a groundnut digger. This consists of a single digging plough and was modified for attachment to the David Bradley Walking tractor. The performance was satisfactory except on areas of compacted soil. The specified capacity per day is 0.45 acre. The second piece of equipment was a groundnut thresher operated off the belt pulley of the tractor. Harvested vines were hand fed into the threshing chamber. Some difficulties were encountered with the equipment but steps are being taken to overcome these. Seeding and fertilising were done with the David Bradley Walking tractor.

The commercial trial is being repeated and all the treatments necessary for successful growth of the crop will be adopted. The operations from sowing to harvesting will be done with the pieces of equipment used in the previous trial. This trial which has already been planted will be harvested around April.

The herbicide trial which was harvested in December is now being analysed and would be included in the 1968 Research Report. Preliminary indications are that applications of herbicides result in a significant reduction in weeds. The herbicides being tested are Afalon, Planavin and Tok E.

The following experiments on peanuts are in progress:-

- (a) Varietal trial. The seven (7) varieties of peanut tested at the Central Agricultural Station are being used in this experiment. These include the four Mexican varieties, DeCieras 1, DeCieras 2, Rastrera Gigante, and RF 211 - NC 2, Virginia Bunch, AK 62 (FAO 11899) and one from Surinam.
- (b) Fertiliser experiment to determine the optimum levels of Nitrogen, Phosphorus and Potash required for the variety AK 62.
- (c) Fertiliser experiment with trace elements.
- (d) Nematocide trial for controlling rootknot nematodes.

Onions

Ten varieties of onions obtained from the U.S.A. were sown in the nursery on 28th October, 1967. After 57 days, the seedlings were transplanted in the field. Three applications of fertilisers were made in the nursery and three in the field. Harvesting of the bulbs were done after 183 days. The yields expressed in pounds of cured bulbs per acre were:-

Tropicano Hybrid	13,430 lbs
Yellow Bermuda	12,920 "
Golden Pera	11,050 "
Red Creole C 5	8,160 "
Crystal White Wax	7,565 "
Yellow Creole	5,100 "
Tule	4,590 "
San Felipe	2,380 "
Red Creole	1,870 "
Eclipse L 303	935 "

In this trial, the most outstanding varieties from the point of view of yields proved to be Tropicano Hybrid, Yellow Bermuda and Golden Pera. These varieties also proved to be the best storers. Golden Pera, Tule and San Felipe tended to produce excessive vegetable growth which caused some difficulty in curing and drying.

The trial with these varieties is now being repeated.

Carrots

A varietal trial with three medium rooted varieties viz: Nantes, Danvers Half Long and Supreme Half Long has recently been planted. A fungicidal trial for control of leaf spotting disease has been laid down.

Sweet Potatoes

The seven cultivars obtained from the U.W.I. are being evaluated for yields on this soil type.

Citrus

The fertiliser experiment on lime (Experiment No. 195) planted in 1965 was abandoned because of a severe attack of what is thought to be Tristeza virus disease. Replanting of this experiment will be done with rough lemon rootstock on which is budded virus-free West Indian lime. Three rows of the existing experiment will be retained for observational purposes.

One new experiment was laid down in November to determine effects of magnesium and trace elements on the growth and yield of grapefruit. The variety Marsh on Rough lemon rootstock is being used.

The fertiliser and varietal trial with oranges is being continued. The aims of this experiment are (a) to compare the agronomic characteristics of the varieties, Valencia, Ruby, Washington Navel and Pineapple and (b) to compare two (2) fertiliser regimes.

Coconuts

The fertiliser trial on the four (4) acre block is being continued. The trees are now $4\frac{1}{2}$ years old and have shown satisfactory growth so far. Height measurements are being taken at twice yearly intervals. The objectives of the experiment are (a) to determine whether compost exerts any significant effect on establishment and early growth of the crop and (b) to compare the effectiveness of slow release fertilisers and normal soluble fertilisers.

A small plot of dwarf coconut established in 1967 with nuts from St. Lucia was kept under observation.

Oil Palm

Blocks of the varieties Dura/Deli (Surinam) 8/1, Dura Deli (Surinam) 12/2, Deli Pisifera (Nigeria) and Dura/Deli 10/66 were established. In due course a fertiliser experiment will be superimposed on this.

Pineapples

A fertiliser trial with the variety Smooth Cayenne was planted during the year. The trial with the local variety Monsterrat, planted in 1967 was continued. The fertiliser treatments are:-

- A 1 NPK + Fe
- B 1 NPK + N + Fe
- C 2 NPK + Fe
- D 2 NPK + N + Fe

The aims of the experiments are (a) to compare the NPK fertiliser 12:12:17:2 at two rates, 200 and 400 lbs/acre applied at three monthly intervals and (b) to determine whether iron applied to the foliage as a spray gives significant improvement in growth and yields of the crop.

Grasses

Two fertiliser experiments with the grasses Digitaria decumbens and D. setivalva are in progress. In one of these experiments urea and ammonium sulphate are being compared and the other is determining the effects of N, P and K singly and in combination.

Observation plots

Observation plots of the following crops are being maintained:

- (a) cashew - planting material of these were obtained from the Rupununi and Trinidad.
- (b) tropical apples - these were obtained from Queensland Australia through the Guyana Development Corporation. The growth of the plants has not been satisfactory.
- (c) pineapples - a plot of the different types collected locally is being observed for growth, yield and quality of fruit.
- (d) grasses and tropical legumes.

G. Wauna Research/Demonstration Plot

The research work at Wauna is mainly restricted to the permanent crops, and in particular fertiliser studies on these crops. Since work on the plots were started around 1965, no definite conclusions can be drawn from experiments now in progress.

Citrus

The fertiliser experiment on this crop was planted in November, 1965. The design is that of a randomised block with three treatments and three replications. Two mixed fertilisers, 15:15:15 and 12:12:17 and trace elements are being evaluated.

Coconuts

This experiment was planted in June 1966 and the fertilisers 15:15:15 and 12:12:17 are being compared. The experiment is of a randomised block layout with four treatments and three replications.

Blackpepper

The fertiliser experiment planted in 1967 to determine the nutritional requirements of the crop suffered from attacks of root knot nematodes. It was replanted in November, 1968. The experiment is of a randomised block layout with the following treatments:

A	Control
B	N.P.K.
C	N.P.K. & Compost
D	P.K.
E	N.

Cocoa

A varietal and spacing trial was laid down in 1964. Three plant spacings - 12' x 8', 12' x 12' and 12' x 16' and two fertiliser regimes of 15:15:15: fertiliser are being tested.

Pineapple

A fertiliser trial with the variety Smooth Cayenne was laid down during the year. A similar trial with the local variety Monsterrat will be laid down early in 1969.

Observation plots

Observation plots of oil palm, limes, grapefruit, oranges, avocado, plantains, tropical apples and coffee are being maintained. The avocado pears and oil palm have been interplanted with plantains. The coffee plots have been replanted with robusta, the seeds of which have been obtained from Surinam.

Annual

Some work on annual crops and in particular groundnuts, cabbages, carrots and onions will be started in 1969.

H.

Long Creek Research Plot

Work at the Long Creek plot was only started around the middle of 1968. The area was cleared by cutting of the trees with a motor-powered hand-saw and the stumps were removed by use of pickaxes and shovels. Clearing of this type of soil with heavy equipment need to be avoided because of the danger of disturbing the very thin organic layer, on the surface. Emphasis is being placed on the grasses, legumes and perennial crops. So far plots of the following crops have been established.

(a) Lemon grass (Cymbopogon citratus). This was established from planting material from the Central Horticultural Station. The grass is being cut at regular intervals and samples sent to the Tropical Products Institute, London, for determination of the citral content.

(b) Forage legumes: Centrosema sp.
Calopogonium sp.
Pueraria sp.

Other legumes would be established as these become available.

(c) Forage grasses:

<u>Digitaria decumbens</u>	299601
" "	296210
" "	299608
" <u>swazilandensis</u>	299838
" <u>milianjiana</u>	299731
" <u>pentzii</u>	299747
" decumbens	6535
" setivalva	
Pangola A 24	
Para grass	

(d) Pineapples: Plots of the varieties Smooth Cayenne and Monsterrat have been established, and on these, various fertiliser treatments have been superimposed. Growth of the pineapples have been satisfactory.

(e) Citrus: Two plots of oranges and limes on rough lemon rootstock have been established. A number of fertiliser treatments will be tried.

(f) Cashew: A plot of cashew has been established in the forest which has been selectively cleared. As the cashew plants increase in size, other trees around would be removed. The plants were propagated from selected seeds from the Rupununi. The plot will be extended to 5 acres as cashew from other sources become available.

(g) Annual Crops: Some of the vine crops which cover the soil very rapidly e.g. pumpkins, watermelons, cucumbers will be planted early in the near year.

I Rice

Rice Breeding

During the period under report, thirty F_2 populations and ten F_3 populations were processed in the field, and one hundred and six new crosses were made involving the use of sixty three parents.

With reference to the objectives of the breeding programme (Ann. Rept., 1966), a major break-through has recently occurred as a result of transgressive segregation for grain length and duration in the F_3 of the cross BG 79 x IR 400-28-4-5. In this

F_3 population of one hundred and thirty-three rows, a total of thirty-nine rows were observed to contain segregates which combine the characters of improved plant type, long slender grain and short duration (seeding to flowering period of 61-63 days). The cooking characteristics and the reaction to Piricularia oryzae Cav. of the desirable segregates are still to be determined, but of these two aspects the quality characteristics will be the overruling factor for the final selections prior to yield testing.

A total of three hundred and ninety-eight varieties and selections were grown in the breeding nursery observation plots. The seeding to flowering period of this material fell within the range 53-111 days. Several of these breeding nursery entries having early to moderately-early duration and long grain were used as parents in the crosses made during the year.

The search for new germ plasm continued and late in 1968 and additional four hundred and eighteen varieties and selections were introduced and are now under observation. On a different front, the screening of irradiated material for resistance to the P. oryzae complex continued at the Atkinson site. Of the nine hundred and forty-seven M_3 rows tested comprising several variety-irradiation combinations, eight rows of BG 79 5 mw N_f 7 min contained several plants which exhibited moderate resistance. The variety BG 79 has always been very susceptible at the Atkinson site and this was the first indication that mutations in the direction of resistance had occurred in the material so far tested.

From two hundred and seventy-two M_3 20-plant and bulk populations, eight hundred and nineteen selections were carried forward to the M_4 , and subsequently five hundred and one selections were carried forward to the M_5 . The selections brought forward to the M_5 were in all cases of shorter stature than the original variety, and in addition some of these selections were earlier than the original variety, by as much as fourteen days. The selections now growing in the M_5 were taken from the following variety-irradiation combinations:

BG 60/44, BG 60/282 and D 52-37 each at 15 Krad gamma rays
 BG 60/44 30 Krad gamma rays
 BG 60/44 N_f 8.5 min.

The screening of Group I and Group II International Uniform Blast Nursery material received from the International Rice Research Institute was continued during 1968; from these two sets totalling five hundred and seventy-nine entries no highly resistant or resistant material (scale 1 and 2) was obtained.

The screening of breeding nursery observation plot entries for resistance to flooding during the first fourteen days as from seeding was continued and a total of five hundred and sixty-three varieties and selections were tested under a continuous flood of six inches of muddy water. These tests served to identify just nine entries in which emergence exceeded twenty-five per cent. The source of these hardier types were India (2), Japan (3), the United States of America (3) and one local line.

Deep-water seeding was also used as a selective force on the F_2 of the cross BG 79 x Peta. The mean emergence of F_2 seedlings, BG 79 x Peta. The mean emergence of F_2 seedlings, BG 79 and Peta were approximately six, thirty-one and seventeen per cent respectively. The surviving F_2 plants were slightly shorter than either parent at maturity and remained upright until harvest; lodging was partial in Peta and complete in BG 79. The F_3 of this cross will also be subjected to deep-water seeding and selected F_3 plants will be used in crosses with short-statured indicas from Taiwan and the International Rice Research Institute.

Rice Herbicide Trials

Several new herbicides were tested in dry-seeded Bluebelle crops in two trials during the year. In neither trial was there significant differences between treated and control (non-weeded) plots, either in terms of yield of paddy per acre or of weed infestation due mainly to the low level of weed emergence in the control (non-weeded) plots.

The granular pre-emerge herbicides such as DBN and Nitrogen appeared to function less efficiently under a dry-seeding regime. Work is in progress to check out the value of Nitrogen (G) as a weedicide in wet-seeded rice.

I. Routine and Advisory

Routine Analyses

The Chemistry Division continued to analyse soil samples from farmers' lands and to provide advice on their suitability for agricultural use or how they may become suitable for such use. Over 2,000 soil samples were received, this represented an increase of more than 100% over 1967.

For the first time an attempt was made to group the soils analysed according to their region of origin. This, it is hoped, will eventually lead to the production of a soil fertility map for most, if not all, of the cultivated soils of our country.

A small number of grass and feed samples along with daily milk samples from the Ministry's Stock Farm were also analysed.

(b) Testing farmers' cane

For the autumn crop, 42 tests of farmers' cane were done by the staff of this division. These tests were carried out at the following estates; L.B.I., Enmore and Albion.

These tests are usually performed during the evening, generally Sunday, and on several occasions staff had to remain on the estates concerned until 1.00 and 2.00 a.m. of the following morning. This was very tiring and frustrating, and as stated in last year's report, this entire question of testing farmers' cane needs to be reviewed.

(c) Meetings

The Principal Agricultural Officer (Research) served on the committee appointed by Government to investigate the Coconut Industry. He also participated in meetings at the Ministry of Finance of the committee dealing with matters relating to the Rice Industry.

The Chemist attended the meetings of the following committees:-

- (i) Committee investigating the use of Chemicals and Pesticides.
- (ii) National Specification Board, Agricultural Sub-Committee.

(d) Visits

Visits were made by members of the research staff to Matthews Ridge, Tumatumari, North West District, Pomeroon, Bartica, Essequibo Islands and Coast, West Demerara, Demerara River, Ituni, Ebini and Berbice.

Training Courses, Field Day, etc.

A training course in rice grading was conducted for the benefit of the staff of Guyana Rice Development Company. New types of equipment purchased by the Company on recommendations by the Ministry were demonstrated.

A field day was held at the Central Agricultural Station on February 16, 1968. Farmers were shown the research work being done on rice and on new crops such as corn, onions, sorghum, soya beans, irish potatoes, etc. Talks were also delivered by the various members of the research staff.

Demonstrations on the use of 'Mirex 450' pelleted bait and the swingfog machines, for control of the acoushi ants were carried out at St. Francis Mission, Matthews Ridge, North West District and on the East Coast Demerara.

During Guyana Week, some thirty (30) schools were taken on conducted tours around the Central Agricultural Station.

Conferences

The Principal Agricultural Officer (Research) represented the Ministry at the Sixteenth Annual Meeting of the American Society for Horticultural Science - Tropical Region and the Sixth Annual Meeting of the Caribbean Food Crop Society held at the University of the West Indies, Trinidad from July 7 to 13, 1968.

The Principal Agricultural Officer (Research) represented Guyana at the Meetings of the Carifta countries held in Grenada between November 18 to 19, 1968, which dealt with Animal and Plant Quarantine and Protections Restrictions.

STAFF

- C. P. Kennard, D.I.C.T.A., B.Sc., - Principal Agricultural Officer
M.Sc. - (Research)
- A. L. Agard - Agricultural Officer - Central
Agricultural Station.
- J. O. P. Adams - Chief Clerk

Entomology

- R. H. Rai, B.Sc., Ph.D. - Entomologist
- W. R. Harper - Senior Technical Assistant
- K. Croal - Grade I Technical Assistant

Plant Pathology

- S. Bisessar, B.Sc. - Plant Pathologist
- P. Stephenson, B.Sc. - Agricultural Assistant

Chemistry

- H. A. D. Chesney, B.Sc., M.Sc., - Chemist - Soil and Soil
Fertility
- G. C. Shukla, M.Sc., Ph.D. - Chemist - Crop and Fertiliser
Studies
- M. V. Ramarao, B.Sc., M.Sc. - Chemist - Analytical
- L. Massay - Grade I Technical Assistant

Soil Surveys

- H. Ramdin, B.Sc., M.Sc. - Soil Surveyor
- Z. Khan - Grade II Field Assistant

Rice

- M. S. Pawar, B.Sc., M.Sc., - F. A. O. Rice Geneticist
- V. E. A. Chin, B.Sc. - Agricultural Officer

Agricultural Engineering

- P. A. Scott, B.Sc., - Agriculture Engineer
- J. Bassier, B.Sc. - Agriculture Engineer - Soils
and Water

Annual and Perennial Crops

- R. Dyaljee, B.Sc. - Agricultural Officer
- R. S. Chetram, B.Sc., M.Sc., Ph.D. - Economic Botanist
- P. O. Jackson - Agricultural Assistant

Central Horticultural Station

B. B. Trotman - Agricultural Assistant

Ebini Crop Station

J. F. White - Research Assistant

Wauna Research/Demonstration Station

G. Crawford - Research Assistant

Long Creek

C. Fraser - Research Assistant

Mr. C. B. Ching (Agricultural Officer) relinquished his position as Officer-in-Charge of Annual Crops as from the end of May.

Mr. L. R. Flynn (Chemist) returned to U.K. in August after spending about fifteen months in the Chemistry Division. Mr. R. E. Fletcher (Agricultural Officer) and D. Jawahir (Agricultural Field Assistant) entered the U.W.I. Trinidad in September, the former to do post graduate studies and the latter a B.Sc. degree in Agriculture. Miss E. Grant (Agricultural Assistant/Rice Division) was transferred to the Information Division in September.

The Research Staff was strengthened towards the end of the year with the appointment of Drs. Chetram, Rai, Shukla and Mr. Ramarao as Economic Botanist, Entomologist and Chemists, respectively. Mr. R. Dyaljee assumed duty as Agricultural Officer in place of R. E. Fletcher. Mr. H. Ramdin resumed duty as Soil Surveyor after doing a post graduate course in soils in Belgium.

PUBLICATIONS

The following publications were put out by the research staff:

1. Research Report, Vol. I, 1967.
2. Chin, V. E. A. - Bluebelle cultivation. Farm J. of Guyana, Vol. 28, No. 2 (1967).
3. Fletcher, R. E. - Developing the Intermediate Savannahs Farm J. of Guyana Vol. 28, No. 2 (1967).
4. Bisessar, S. - International blast nursery for the Americas. Rice Review 10: 23-24.
5. Bisessar, S. - Control of blast with antibiotics. Rice Review 10: 17-18.
6. Bisessar, S. - Citrus tristeza in Guyana. F.A.O. Plant Prot. Bull. 16: 45-48.
7. Bisessar, S. - Plant parasitic nematodes of crops in Guyana. Pest Articles and News Summaries (in press).
8. Kennard, C. P. & Ching, C. B. - Growing hybrid corn. Farm J. of Guyana (in press).
9. Kennard, C. P. - The cultivation of onions. Farm J. of Guyana (in press).
10. Fletcher, R. E. - Growing peanuts. Farm J. of Guyana (in press).
11. Hints on the growing of irish potatoes (leaflet).

RAINFALL DATA - 1968

(in inches)

Stations	January	February	March	April	May	June	July	August	September	October	November	December	Total
Central Agricultural Station (Mon Repos)	4.77	9.91	6.92	5.97	7.48	14.27	8.58	2.62	4.57	2.66	7.04	5.27	80.06
Central Horticultural Station (Atkinson Field)	9.87	9.33	7.85	9.60	9.71	18.27	12.90	6.92	5.33	3.64	11.25	5.21	109.88
Ebini	10.51	3.28	2.77	9.52	8.47	15.45	12.63	7.20	1.45	1.87	8.68	3.15	84.98
Wauna	5.17	3.87	2.53	6.21	9.08	13.88	15.76	9.72	5.06	8.18	7.37	5.66	92.51
M.A.R.D.S.	8.65	4.37	4.96	10.07	8.40	16.82	9.06	1.41	2.49	0.36	7.84	2.97	78 .21

THE VETERINARY AND ANIMAL HUSBANDRY DIVISION

Organization and Administration

The Veterinary and Animal Husbandry Division is staffed by the Principal Veterinary Officer and seven district Veterinary Officers with one or more technical assistants attached to each officer. Also attached to this division are an Agricultural Officer (Livestock), a Poultry Officer, a Swine Production Officer mainly concerned with Swine Extension duties, three Farm Managers, five artificial inseminators of cattle, and five Livestock Assistants. During the year the staff of the division was strengthened by the addition of two Veterinarians - Dr. and Mrs. A.B. Watkins. Dr. Raja resumed duty after a period of home leave spent in India but at the end of the year there were still two vacancies for Veterinary Officers and the important post of Livestock Officer also remained unfilled.

Mr. B.A. Lunau, F.A.O. Animal Production Officer unfortunately got quite ill and had to return home to Denmark before the expiration of his tour of duty. During the period he spent with us he assisted in increasing our beef cattle production and also on swine production. Mr. Lunau performed his duties quietly and efficiently and put forward some useful proposals which would have their effect on the cattle industry as they are implemented.

We were sorry to see Mr. Lunau leave under such unfortunate circumstances. We wish him a speedy recovery.

Twelve (12) young Guyanese were selected for a two years' practical course in Ranch Management practices at the Tuskegee Institute in the United States of America, and of the twelve, five were members of the Veterinary and Animal Husbandry Division. In addition, another technician went to West Germany on a two years' scholarship to study Animal Husbandry practices.

The function of the Veterinary Officer in a district is to diagnose and treat animal diseases and to take measures to control and prevent the spread of infectious and contagious diseases by prophylactic inoculations, isolation, restriction of movement and slaughter where necessary. In addition, the Field Assistants of the Extension Staff undertake the treatment of minor ailments and render first aid to sick animals. Veterinary Officers also advise on Animal Husbandry and nutritional problems and matters of extension among livestock farmers.

Animal Husbandry Policy

The Ministry's Policy is to improve and increase livestock production through the Extension and the Veterinary and Animal Husbandry Services.

There are three main Livestock Stations in operation viz: Central Agricultural Station in Demerara, Ebini on the Intermediate Savannas and St. Ignatius in the Rupununi.

The Central Agricultural Station deals with dairy cattle, pigs, sheep, goats and poultry, and the other two with beef cattle, mainly. The Division again rendered outstanding service to the community.

Animal Health

A. Virus Diseases

Foot and Mouth Disease

During the early part of the year, we kept up our elaborate precautions on our border with Brazil and all outposts were manned by technical officers as well as Policemen. This was done in order to prevent Foot and Mouth disease from spreading from the neighbouring Roraima territory of Brazil to the Guyana side of the border. Our outposts were disbanded when the rains came and the rivers became flooded thereby preventing the movement of cattle and human beings across the border.

The Second Tripartite Conference on Foot and Mouth disease between Brazil, Venezuela and Guyana was held in Georgetown, Guyana, during the year and our co-operation with our neighbouring countries in the common fight against Foot and Mouth disease was further strengthened.

Guyana remained free of Foot and Mouth Disease.

Paralytic Rabies in Cattle

During the year there was no reported case of Rabies on the Essequibo Coast and this must be the direct result of Vaccination Campaigns carried out in previous years in this area. Vaccination campaigns continued throughout the year and it is hoped that Rabies in cattle would be finally controlled by this method.

There was also some improvement in the Rupununi District due to the fact that more ranchers continued to inoculate their animals against this dreaded disease. However the disease still took its toll of animals in the Rupununi district and an unknown number of animals died from it. On other coastal areas, several outbreaks were investigated and preventative inoculations were carried out in the Essequibo Islands and other Riverain areas. Bats were destroyed wherever possible.

Rabies in Dogs and Cats

The stringent regulation requiring the absolute segregation in quarantine of all dogs and cats arriving from 'Rabies infected' areas before admission to Guyana has proven to be one of the most annoying problems the Division has had to deal with so far. However, although pet quarantine may still be our most "annoying" problem, it cannot be denied that it has kept rabies in dogs and cats out of Guyana.

Equine Encephalitis

There were eight (8) deaths in horses in Leguan in the Essequibo Islands. Equine Encephalitis was suspected from the clinical symptoms manifested. As a result an inoculation campaign was mounted and the few remaining horses on the island were inoculated against the disease.

Equine Influenza

No cases were reported during the year.

Newcastle Disease and Fowl Pox

There were sporadic outbreaks of these diseases during the year in isolated flocks. A few cases of Newcastle disease were reported in the various districts and 170 cases of Fowl Pox were diagnosed in the Berbice district alone.

Inoculations against Newcastle disease and Fowl Pox were carried out in the various districts while 40,559 chickens were inoculated against Newcastle disease and Fowl Pox at the Central Agricultural Station, Mon Repos. The policy of preventative inoculations against these two diseases had adequately controlled the spread of the diseases throughout the country.

Avian Leukosis Complex

The incidence of this disease is still on the increase.

Avian Encephalomyelitis - Epidemic Tremors

No cases were diagnosed during the year and the incidence of this disease seems to be definitely on the decline.

B. Bacterial Diseases

Anthrax

No cases in cattle were reported during the year.

Blackleg

There was one serious outbreak towards the end of the year in the Karasabai area of the Northern Savannahs of the Rupununi district. A successful vaccination campaign was mounted to bring the outbreak under control.

Brucellosis

Similarly, no large scale testing of animals was carried out during the year. However, 76 bovines were tested and there was only one positive reactor.

Swine Erysipelas

Twenty four (24) cases of Swine erysipelas were treated during the year. The breeding stock at the Central Agricultural Station, Mon Repos is vaccinated at six month intervals while all weaners are vaccinated before sale to the districts. 207 weaner piglets were vaccinated at the Station during the year. 19 pigs were also vaccinated in the districts.

Tetanus

There were five cases in equine species, one case in a pig, one case in a sheep, one case in a goat and three cases in the bovine during the year.

Chronic Respiratory Disease

The incidence of Chronic Respiratory Disease continued to drop somewhat due to improved management practices on poultry farms. However, this condition continued to cause major trouble on most of these farms.

Salmonellosis - Pullorum Group (Avian)

No pullorum testing was carried out during the year due to shortage of staff.

Mastitis

One hundred and seventy three (173) cases were reported in the bovine, three (3) cases in sheep, thirty eight (38) cases in pigs and seven (7) in goats.

Metritis

Seven (7) cases in the bovine, six (6) cases in pigs one in a goat and one in an equine were treated during the year.

Miscellaneous

A large number of other cases was treated by Veterinary Officers in their various districts.

C. Protozoan Diseases

Anaplasmosis and Piroplasmosis

There was a noticeable drop in the number of cases treated for these diseases. Fifty four (54) cases of Piroplasmosis and six (6) cases of Anaplasmosis were treated. On Government Stations, animals are routinely sprayed at regular intervals to control tick infestation.

Trypanosomiasis

There was no major outbreak of the disease during the year. However, a few isolated cases in horses were confined to various parts of the Rupununi District.

Coccidiosis

One hundred and sixty four (164) cases were reported among poultry flocks - mainly in the Berbice District.

Histomoniasis (Blackhead)

Two hundred and eighty three (283) cases were reported during the year - mainly in the Berbice district. This disease continues to be of major importance in the Poultry Industry, and is quite prevalent throughout the Country.

D. Fungus Diseases

Ringworm

Ten (10) cases in cattle were reported.

E. Parasitic Diseases

(i) Internal

Internal parasites are common with all classes of livestock on the Coastal Belt where the high temperature and humidity favour the development and multiplication of these parasites. In the savannahs, internal parasites are less of a problem except in the case of calves.

(ii) External

External parasites, particularly ticks, mosquitoes and biting flies are of great importance as vectors of disease. In this respect, ticks are of major importance.

(iii) Mange

Several cases of equine mange were reported and treated in the Northern and Southern savannahs of the Rupununi District. There were frequent outbreaks in horses on several ranches in this area.

Total number of cases attended

8,342 cases were attended by members of the Veterinary Division during 1968.

Laboratory - Bacteriological and other Diagnostic Services

The work of this section was again confined almost entirely to faecal examinations for internal parasites of the domestic animals. A total of 1,113 samples were examined of which 355 were examined for parasites. 435 milk samples were tested for butterfat percentage.

Artificial Insemination Service

The artificial Insemination Service showed only slight improvement during 1968 in the total number of services performed throughout the country. This number is, however, still below 3,000 and every effort must be made in the coming year to improve and expand this service. There was a substantial increase in the total number of services performed in the East Bank Demerara district.

Two posts of Grade 1 Artificial Insemination technician have been placed on the estimates and these are to be filled shortly.

District	Services					
	1st	2nd	3rd	From	to	Total
East Coast Demerara	438	133	87	222	222	658
Essequibo	4	1	-	-	-	5
Leguan	56	21	2	14	14	79
Berbice	50	4	-	3	3	54
East Bank Demerara	316	123	123	118	118	562
Stockfarm	517	199	121	220	220	837
Total	1,381	481	333	577	577	2,195

Animal Husbandry and Animal IndustryDairy Cattle - Central Agricultural Station

During the year the stock of Dairy animals at the Central Agricultural Station decreased from 435 animals at 1st January, 1968 to a total of 425 animals at 31st December, 1968. One hundred and sixty one (161) calves were born comprising eighty (80) bulls and seventy-five (75) heifers, an increase of eighty five (85) over last year's figure. There were four (4) still-births and two (2) abortions.

Sixty six (66) deaths were recorded. Ninety three (93) animals were sold of which six (6) were for breeding purposes and eighty seven (87) for slaughter - due to anatomical defects which made them unfit as breeding stock.

Two hundred and ten (210) animals were milked producing a total of 53,164 gallons of milk. Most of this milk was sold to the Government Milk Pasteurization Plant and the remainder was fed to young livestock on the station.

Dairy Improvement Scheme.(i) U.S. Heifers

The animals maintained good condition and satisfactory milk yields.

Fifty six (56) of these animals calved during the year producing fifty five (55) calves - twenty two (22) heifers and thirty three (33) bulls. There was one abortion. Twenty (20) animals from this stock died.

(ii) Puerto Rican Heifers

Thirty-five (35) of these animals calved during the year producing twenty heifers and twelve bulls. Fourteen (14) animals from this herd died during the year. There were three still births.

Most of these animals are good producers and are standing up favourably to local conditions.

Beef Herd

Twenty (20) animals forming the nucleus of a small experimental beef unit were purchased from Florida, United States of America and arrived at the Livestock station about mid-year after spending a period in Quarantine. They appeared to be acclimatizing satisfactory.

Cow Hides

During the year 653 hides and 124 bags of dry salted cow hides were exported to Amsterdam, Holland weighing 168,054 lbs. Forty three (43) bags weighing 2,979 lbs of hides were exported to London, England. A total of 171,033 lbs of dry salted cow hides were therefore exported.

Cattle

750 head of live cattle were exported to Suriname.

Sheep and Goats

The situation remained the same as last year.

At the Government Livestock Farm fifty one (51) births were recorded. Sixteen (16) head, mainly rams were sold for breeding purposes and eighty seven (87) for slaughter. The composition of the flock is Barbados Black Belly and Border Leicester crosses. The deworming programme was continued during the year with very good results.

The demand for goats is still small and farmers were supplied with Anglo-Nubian and Alpine breeding bucks. Twenty seven (27 goats were sold during the year and six (6) were born during the period under review.

PIGS

Sixty six (66) pigs of the Yorkshire, Landrace, Hampshire and Duroc Breeds arrived in Guyana during February 1968 to augment our severely depleted breeding stock. These pigs started to farrow from October and weaner piglets of a high quality were available for sale to farmers at the end of the year. As far as is known this was the first occasion on which the Duroc breed was introduced to Guyana.

During the year 370 piglets were born, 207 were sold for breeding and fifteen (15) for slaughter. There were 103 deaths.

POULTRY

During the year 101,780 eggs were produced at the Central Agricultural Station, Mon Repos, and 40,559 chickens were sold to farmers in the districts.

Poultry Feeds

The prices of poultry feeds remained high during the year due mainly to the high price of imported raw materials and an acute shortage of local ingredients. Efforts are being made to produce more corn locally.

Disease Control

Apart from a serious outbreak of Newcastle disease on one farm there was no major outbreak of disease but Chronic Respiratory Disease (C.R.D.), Blackhead, Coccidiosis and Avian Leucosis Complex including Marek's disease continued to be the major problems on poultry farms. Routine vaccinations against Newcastle and Fowl Pox diseases were done by farmers.

Poultry meat imported

Duck meat (eviscerated without giblets)	- 600 lbs from Canada
Turkey meat(" " ")	2,590 lbs and 49 cases (from Canada and the U.S.A.)
Ducklings imported	-3,295
Goslings imported	- 50
Turkey poults imported	- 935
Guineas imported	- nil

IMPORTS AND EXPORTS

The following were imported

- (1) 82 -Canaries from England
- (2) 2 -Cabaries from Surinam
- (3) 2 -Pet birds from Surinam
- (4) 2 -finches from Surinam
- (5) 2 -Parrots from Trinidad
- (6) 1 -parakeet from Trinidad
- (7) 3 -deer from England
- (8) 2 -monkeys from Surinam
- (9) 10 -dogs from England
- (10) 18 -dogs from Trinidad
- (11) 12 -dogs from Barbados
- (12) .5 -dogs from U.S.A.
- (13) 1 -dog from Canada
- (14) 1 -dog from Kenya
- (15) 1 -dog from Argentina
- (16) 3 -dogs from Jamaica
- (17) 4 -cats from England

Imports included

- (1) Canaries from England, Surinam
- (2) Pet Birds from Surinam
- (3) Finches from Surinam
- (4) Parrots from Trinidad
- (5) Parakeet from Trinidad
- (6) Jeer from England
- (7) Monkeys from Surinam
- (8) Dogs from England; Trinidad;
Barbados, U.S.A.; Canada; Kenya
Argentina and Jamaica
- (9) Cats from England; Trinidad;
U.S.A.
- (10) Horses from Trinidad; England;
and Barbados
- (11) Opossums from Trinidad
- (12) Tanagiers from Surinam
- (13) Toads from Surinam
- (14) Frogs from Surinam

Imports continued

- (18) 2-cats from Trinidad
- (19) 1-cat from U.S.A.
- (20) 18-horses from Trinidad
- (21) 6-horses from England
- (22) 2-horses from Barbados
- (23) 4-~~o~~possums from Surinam
- (24) 4-tanagiers from Surinam
- (25) 8-toads from Surinam
- (25) 5-frogs from Surinam.

The following were exported

- (1) 1,527 - monkeys to U.S.A.
- (2) 15 - monkeys to Martinique
- (3) 341 - monkeys to England
- (4) 85 - monkeys to France
- (5) 2 - monkeys to Japan
- (6) 5 - monkeys to Denmark
- (7) 1 - monkey to Barbados
- (8) 2 - monkeys to Haiti
- (9) 1 - monkey to Puerto Rico
- (10) 7 - monkeys to Holland
- (11) 40 - monkeys to Belgium
- (12) 51 - monkeys to Germany
- (13) 2 - manatees to Germany
- (14) 3 - Coati mundis to U.S.A.
- (15) 5 - Coati mundis to England
- (16) 5 - Coati mundis to Trinidad
- (17) 3 - Capibara to U.S.A.
- (18) 3 - Capibara to Denmark
- (19) 1 - Armadillo to U.S.A.
- (20) 1 - Agouti to U.S.A.
- (21) 2 - Agouties to England
- (22) 1 - Water Dog to Trinidad
- (23) 2 - Anteaters to Trinidad
- (24) 1 - Anteater to Germany
- (25) 3 - Anteaters to England
- (26) 1 - Anteater to Belgium
- (27) 2 - Porcupines to England
- (28) 1 - Sloth to England
- (29) 3 - Sloths to U.S.A.

Exports included

- (1) Monkeys to U.S.A.; Martinique; England; France; Japan; Denmark Barbados; Haiti; Puerto Rico; Holland; Belgium and Germany.
- (2) Manatees to Germany
- (3) Coati mundis to England; and Trinidad
- (4) Capibara to U.S.A. & Denmark
- (5) Armadillo to U.S.A.
- (6) Agouti to U.S.A. & England
- (7) Water Dog to Trinidad
- (8) Ant Eaters to Trinidad; Germany; England and Belgium.
- (9) Porcupines to England
- (10) Sloth to England and U.S.A.
- (11) Anaconda to England
- (12) Tiger Cat to U.S.A.
- (13) Oceloto to U.S.A.; England and Canada
- (14) Iguanas to England
- (15) Lizards to England and U.S.A.
- (16) Turtles to U.S.A.
- (17) Snakes to U.S.A.; England and Surinam
- (18) Deer to Grenada
- (19) Tapir to England and Belgium
- (20) Tar canto to England
- (21) Cecilian to U.S.A.
- (22) Frogs to U.S.A. and England
- (23) Margay to U.S.A.
- (24) Caimans to U.S.A. and England
- (25) Lions to U.S.A.
- (26) Hacka to Trinidad
- (27) Racoon to Trinidad
- (28) Otter to Trinidad
- (29) Parrots to U.S.A.; Holland; Haiti; Trinidad; England; Barbados; Canada; Grenada; St. Vincent; France; Norway; Switzerlang; Germany; Jamaica; Beligum; Martinique; Denmark and Bermuda.

Exports continued

- (30) 2 - Anaconda to England
- (31) 1 - Tiger cat to U.S.A.
- (32) 2 - Ocelots to U.S.A.
- (33) 1 - ocelot to England
- (34) 2 - ocelots to Canada
- (35) 100 - Iguanas to England
- (36) 70 - Lizards to England
- (37) 40 - lizards to U.S.A.
- (38) 92 - lizards to U.S.A. (preserved)
- (39) 4 - Turtles to U.S.A.
- (40) 3 - Snakes to U.S.A.
- (41) 3 - Snakes to U.S.A. (preserved)
- (42) 9 - snakes to England
- (43) 5 - snakes to Surinam
- (44) 3 - deers to Grenada
- (45) 2 - tapirs to England
- (46) 1 - tapir to Belgium
- (47) 1 - Tarcanto to England
- (48) 3 - Cecilian to U.S.A.
- (49) 18 - Cecilian to U.S.A. (preserved)
- (50) 114 - frogs to U.S.A. (preserved)
- (51) 62 - frogs to U.S.A.
- (52) 12 - frogs to England
- (53) 1 - Margay to U.S.A.
- (54) 50 - Caimans to U.S.A.
- (55) 1 - Caiman to England
- (56) 4 - Lions to U.S.A.
- (57) 1 - Hacka to Trinidad
- (58) 1 - Raccoon to Trinidad
- (59) 1 - Otter to Trinidad
- (60) 15 - Parrots to U.S.A.
- (61) 10 - Parrots to Holland
- (62) 1 - parrot to Netherland
- (63) 1 - parrot to Haiti
- (64) 216 - parrots to England
- (65) 24 - parrots to Trinidad
- (66) 1 - parrot to Barbados
- (67) 9 - parrots to Canada
- (68) 5 - parrots to Grenada
- (69) 3 - parrots to St. Vincent
- (70) 30 - parrots to France
- (71) 1 - parrot to Norway
- (72) 4 - parrots to Switzerland
- (73) 122 - parrots to Germany
- (74) 1 - parrot to Jamaca
- (75) 93 - parrots to Belgium
- (76) 15 - parrots to Martinique
- (77) 50 - parrots to Denmark
- (78) 4 - parrots to Bermuda
- (79) 6 - Macaws to Bermuda
- (80) 19 - Macaws to U.S.A.
- (81) 2 - Macaws to Holland
- (82) 1 - Macaw to Panama
- (83) 31 - Macaws to England
- (84) 3 - Macaws to Trinidad
- (85) 6 - Macaws to Jamaica
- (86) 5 - Macaws to Canada
- (87) 1 - Macaw to Grenada
- (88) 1 - Macaw to Barbados
- (89) 11 - macaws to Belgium
- (90) 1 - parakeet to U.S.A.

Reports included

- (30) Macaws to Bermuda; U.S.A.; Holland; Panama; England; Trinidad; Jamaica; Canada; Grenada; Barbados; and Belgium
- (31) Parakeets to U.S.A.; Trinidad; Denmark; England; France; Germany; Curacao; Bermuda; Martinique and Netherlands
- (32) Eagle to U.S.A.
- (33) Vultures to Belgium and France.
- (34) Crown Heads to Canada
- (35) Marsh birds to England
- (36) Fire-red birds to Canada; and England
- (37) Jays to Trinidad
- (38) Budgerigars to Grenada; Trinidad and U.S.A.

Exports continued

Exports included

- (91) 2 - Parakeets to Trinidad
- (92) 50 - parakeets to Denmark
- (93) 252 - parakeets to England
- (94) 30 - parakeets to France
- (95) 50 - parakeets to Germany
- (96) 2 - parakeets to Curacao
- (97) 6 - parakeets to Bermuda
- (98) 20 - parakeets to Martinique
- (99) 2 - parakeets to Netherlands
- (100) 1 - Eagle to U.S.A.
- (101) 2 - Vultures to Belgium
- (102) 1 - Vulture to France
- (103) 8 - Crown heads to Canada
- (104) 17 - Marsh birds to England
- (105) 2 - Firered birds to Canada
- (106) 2 - Firered birds to England
- (107) 2 - Jays to Trinidad
- (108) 2 - Budgerigars to Grenada
- (109) 1 - Budgerigars to Trinidad
- (110) 1 - Budgerigars to U.S.A.
- (111) 1 - Twa Twa to Holland
- (112) 7 - Twa Twas to Trinidad
- (113) 2 - Twa twas to Canada
- (114) 1 - Twa twa to Grenada
- (115) 2 - Toucans to U.S.A.
- (116) 2 - Toucans to Barbados
- (117) 8 - Toucans to England
- (118) 6 - Toucans to Trinidad
- (119) 6 - Toucans to Bermuda
- (120) 1 - Toucan to Jamaica
- (121) 57 - Canaries to England
- (122) 21 - Canaries to Trinidad
- (123) 4 - canaries to Jamaica
- (124) 8 - canaries to Canada
- (125) 2 - Cock of the Rock to Trinidad
- (126) 22 - Towa towas to Trinidad
- (127) 2 - Towa towas to Holland
- (128) 4 - Towa towas to Jamaica
- (129) 1 - Towa Towa to England
- (130) 2 - tanagers to England
- (131) 40 - tanagers to Belgium
- (132) 50 - tanagers to Germany
- (133) 50 - Finches to Germany
- (134) 50 - Finches to U.S.A.
- (135) 1 - Finch to Barbados
- (136) 21 - Finches to Trinidad
- (137) 4 - Finches to Venezuela
- (138) 17 - Finches to England
- (139) 1 - Picoplat to Trinidad
- (140) 2 - Traupials to Trinidad
- (141) 2 - Grassbirds to Trinidad
- (142) 1 - Grassbird to Canada
- (143) 1 - Dove to Canada
- (144) 10 - Doves to Martinique
- (145) 6 - Pigeons to Martinique
- (146) 5 - Suckers to Germany
- (147) 2 - Lovebirds to Belgium
- (148) 2 - Lovebirds to Holland,

- (39) Towa -Towas to Holland;
Trinidad;England;Jamaica;
Canada and Grenada.
- (40) Toucans to Barbados; England;
Trinidad, Bermuda; and
Jamaica
- (41) Canaries to England;Trinidad;
Jamaca and Canada
- (42) Tanagers to England;Belgium;
and Germany
- (43) Finches to Germany;U.S.A.;;
Barbados; Trinidad;
Venezuela and England
- (44) Picoplat to Trinidad
- (45) Traupials to Trinidad
- (46) Grassbirds to Trinidad and
Canada
- (47) Doves to Canada; and
Martinique
- (48) Pigeons to Martinique
- (49) Suckers to Germany
- (50) Love birds to Belgium and
Holland

EBINI LIVESTOCK STATION

The Weather

The rainfall figures for 1968 together with figures for other years are set out in a table which follows.

Rainfall recorded at Ebini for the years 1967 - 1968 together with the mean figures for the period 1945-1955.

Year	Monthly totals in inches												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1945-55 (mean)	8.92	6.18	4.50	7.07	10.77	13.05	10.64	8.74	5.18	3.85	5.29	6.66	91.11
1967	7.43	4.64	6.12	8.39	13.14	9.03	7.41	9.73	1.95	.54	5.00	10.12	83.50
1968	10.51	3.28	2.77	9.52	8.47	15.65	13.08	7.20	1.45	1.88	8.68	3.15	85.64

Fertiliser purchases for Ebini during the year are summarised below:-

Date Supplied	Quantities in Tons						
	12-10-18	12-12-17-2	13 ¹ / ₂ -13 ¹ / ₂ -13 ¹ / ₂	15-15-15	Sulphate of ammonia	Triple Super-Phosphate	Muriate of Potash
27 Dec. '67	4						
27 Jan. '68						4	
2 Jan. '68*		50					
7 May '68*			20				
25 June '68							3
25 June '68					5		
25 June '68				10			
20 Aug. '68				10			
20 Aug. '68		4					
5 Nov. '68				15			
26 Nov. '68				15			
Totals	4	54	20	50	5	4	3

OVERALL TOTAL 140

* Delivery spread over 3 weeks.

The Planting of Pastures

The pasture situation has improved considerably during 1968. The serious nature of the stunt virus problem has been much in evidence, but the number of grass species available has increased. Self sown legumes have continued to establish themselves and grow in association with the grasses giving a uniform dense ground cover. New legume species are also under observation. In addition there is much better equipment for land preparation and good progress was made in the mechanisation of planting. Twenty one acres were on newly claimed savannah; otherwise the pastures were formerly of Pangola grass.

Experiments with newly planted D. setivalva have thrown light on some of the factors which influence runner production. Two of the major factors are closely linked to the method and procedure of grass planting; one unfavourable factor seems to be the bringing of subsoil to the surface during land preparation, whilst one of the most positive factors seems to be the early application of fertiliser preferably by depositing it beneath the plant at planting. This information has enabled the Station to go ahead with the mechanisation of grass planting and subsequent weed control measures.

Considerable progress was made in mechanising the actual planting though the machine is an improvised one and very much in the experimental stage. Approximately 1 cwt. of a compound fertiliser is used for 10 acres.

The planting speed is about two acres an hour depending on the condition of the soil.

The Oakes Collection of Digitaria species Strains undergoing trial at Ebini since 1965

Planting material from the Oakes collection was made available to Caribbean countries late in 1964. That selected for this country was first kept on the coastlands and in May 1965 some species were sent to Ebini and planted at the Crop Station on a very sandy soil. (type 800). Late in the year small plots of some of these were established on other soil types. Later, some of the strains were discarded without having been given trials on the other soil types. The original batch did not include any strains of D. pentzii and nine strains were supplied in August 1966. These did not travel well; the weather following their arrival was not very favourable and these were not given proper trial and they died out. In May 1968 the University of the West Indies supplied more species and strains. These have been grown on two soil types and a number of them show great promise. Propagation of these has gone well and there should be sufficient planting material for whole pastures early in 1969.

It has already been pointed out that good progress is being made in building up stocks of the 1968 introductions. The planting material was prepared at the University of the West Indies on 8th May, about three sprigs of each cultivar were sent packed in vermiculate. Mr. S. Cowlshaw of the University of the West Indies had, some months previously, selected many of these cultivars at Puerto Rico and he himself brought them to Ebini and supervised the planting on 11th May. They were planted in the nursery at the Crop Station (very sand soil type 800). They had travelled well; all cultivars survived and further transplanting was soon possible.

During the period 17 - 19 July further plantings were made on a soil type with more clay (820). Multiplication has continued in this same area.

During late August and early September the grasses growing in the Crop Station nursery became heavily infested with chinch bugs. Most species suffered and some were completely destroyed. The affected area was not extensive and was more or less confined to the nursery area. The other museum plots of *Digitarias* situated only 120 yards away were completely free of this pest. It appears that the loose sandy soil of the Crop Station is an environment favourable to chinch bugs; attacks of such severity as this have never occurred in pastures.

Suspected Stunt Virus Infection of *Digitaria* Species

Stunted plants were first noticed at Ebini in 1960 - about four years after Pangola was first introduced. During the following year 20 only isolated plants were observed. By 1964 however, the condition was widespread and the Crop Station fertiliser trial plots planted in that year with Pangola which appeared healthy showed a steady decline in yield over the period 1964 - 1965. One further striking feature about pastures planted since 1965 is the formation of conspicuous tufts where the Pangola was actually planted; These tufts consist of stunted fibrous stems.

The occurrence of symptoms in some of the cultivars is puzzling and examples follows:-

D. decumbens 299597. There are a number of pastures of this grass, some have been regularly grazed since 1965 and 1966. No stunt symptoms in any of these pastures was seen yet the museum plot at the Crop Station seems severely affected.

D. briantha 299617. One noted stunted plants soon after propagation of this species started and as a result only six acres were sown. The soil, low lying and tending to become waterlogged, was clearly unsuitable; a further ten acres during 1968 on a sandier soil (type 810) were planted. Soon after planting one noticed a very small number of stunted plants (less than ten), but the pasture as a whole appears healthy.

D. valida 299887. This grass has behaved rather like *D. briantha* 299617. In a small pasture of 4 acres planted early in 1968 a small number of plants showed stunt symptoms early and probably died out, but otherwise the pasture has remained free of symptoms. These two species have behaved very differently from *D. milaniana* sub. sp. *eylesiana* (P.R. No. 6484) introduced in May 1968. In this case most plants showed symptoms by the end of the year.

D. setivalva 299795. This cultivar has seemed quite healthy throughout and a large acreage has been planted but a few stunted plants were seen in November, 1968. This is almost four years after it was first introduced.

Pasture Legumes

Attention has already been drawn to the way in which the legume *Desmodium triflorum* has become well established over the planted pasture area. It seemed therefore desirable to find out more about this allied species. Dr. H. Fraser has confirmed

that he introduced the species to Ebini in the 1940's from the coastlands. The Commonwealth Bureau of Pastures and Field Crops has supplied a list of references on the species and suggested that we contact the Hawaii Agricultural Experiment Station, Honolulu, where work on Desmodium is being carried out and also the C.S.I.R.O. Cunningham Laboratory, Brisbane, which was in touch with most work on tropical legumes.

The Cunningham laboratory has supplied considerable information about the genus. Desmodium triflorum is naturalised in Australia and most tropical countries especially where there has been heavy grazing and applications of phosphate. It is an efficient nitrogen fixer but because of its small size its nitrogen fixing potential is not great. It has not featured in the Queensland research programme because of its low yield and because of the difficulty in collecting its seed commercially. The allied species D. heterophyllum and D. canum have proved useful in Northern Queensland and D. heterophyllum also in Fiji. The larger scrambling types D. intortum and D. uneinatum are widely grown but they cannot withstand close grazing to the same extent as the other types.

Ant Damage to Pastures

The acoushi ant has usually been regarded as the most troublesome type in our pastures. Yet newly planted grass has always been damaged by other species. A termite which cuts the runners of young grass plants has always been present and numbers of these have increased considerably in recent years.

It is comparatively easy to keep acoushi ants in check but rather difficult to eliminate them. During 1968 the pelleted bait 'Mirex 450' manufactured by Allied Chemical, Nitrogen Division, New York was tried. (The same material has been distributed to farmers on the Berbice River with the help of A.I.D. during 1968). The instructions state that the pellets are poisonous and also that they should not be used in wet weather (presumably because moisture would cause them to disintegrate). This could lead one to think that the pellets can have only very limited use where livestock are numerous. We have however, found them very satisfactory.

The termites' are a bigger problem. The large nests are certainly conspicuous but there are also smaller nests with nothing visible above ground, and the insects seem to block the entrance hole with earth; they are therefore difficult to locate. These inconspicuous nests seem to have considerable underground channels for aldrin poured into them rapidly disappears. It is not known whether the pelleted bait is effective against these termites. Whereas the acoushi ants are more prevalent on higher and usually sandy areas, the termites seem to occur most commonly on the more clayey soil types.

Artificial Insemination

General - Source and Particulars of Semen, Procedure, Number of Calves Born

The station's first ever calves by artificial insemination were born during 1968, one batch during the period January 20 - March 11 and a second batch between August 18 and September 26.

The semen, supplied by the Agricultural Company of Pan America Inc., was from bulls belonging to the following organisations:- Central Ohio Breeding Association, Kentucky Artificial Breeding Association, Northern Illinois Breeding Co-operative, Southern Illinois Breeding Association. The semen was supplied in glass ampoules stored in liquid nitrogen. The liquid nitrogen lasted more than the specified 60 days with the first consignment and all ampoules were used within this time but with the second it had completely evaporated at 44 days and some ampoules were wasted. General particulars of the cows inseminated are given in Table II.

TABLE II
General description of the cows inseminated

Breed of bull (semen donor)	Breeding of cows inseminated	Age of cows	General Remarks
Polled Shorthorn	Varying grades of Santa Gertrudis ranging from half to pure breds.	All ages up to 11 years in some cases this is first calf.	
Santa Gertrudis	Varying grades of Santa Gertrudis ranging from half to pure breds.	do.	
Hereford	Half bred or $\frac{3}{4}$ Santa Gertrudis	All young cows 2nd & 3rd calf	
Aberdeen Angus	Half bred or $\frac{3}{4}$ Santa Gertrudis	Young cows; 1st, 2nd or 3rd calves.	
Jersey	Mainly cows of unknown breeding whose calves had always done well. Some had some Sahiwal blood, some Holstein.	Mainly very old cows.	

The conception rate is low; but is better for the second batch than for the first. The overall low rate is probably accounted for by our lack of experience. All cows that came in season in the various herds were inseminated, whereas more selection should have been practiced. In the interval between the first and second batch of inseminations better records of the cycles and heat periods of cows were kept and consequently for the second batch of inseminations cows with irregular cycles and abnormally long heat periods were avoided. In the first batch some repeat inseminations were made but far fewer in the second. With both batches a number of cows, thought at first to have held, 'turned' after 60-120 days and a considerable number of cows reported to have 'turned' proved later to be in calf.

Birth Weights

Table III lists birth weight particulars as follows:-

TABLE III
Calves got by Artificial Insemination 1968

Particulars of bull		Period of calvings	Sex of calves	No. of calves	Weight in lbs.	
					Mean Birth Wt.	Standard deviation
Breed	Name					
Polled Short- horn	Lynnwood Triumph	January/ March	Both sexes	31	65.6	7.67
"	"	"	Male	22	65.5	7.88
"	"	"	Females	9	65.9	5.0
Santa Gertrudis	Ten	"	Both sexes	16	71.3	12.5
"	"	"	Males	10	73.10	16.7
"	"	"	Females	6	68.20	13.1
Jersey	3 bulls taken together	"	Both sexes	12	55.3	5.96
"	"	"	Males	7	56.4	6.35
"	"	"	Females	5	53.8	4.95
Polled Short- horn	Lynnwood Triumph	August/ September	Both sexes	10	56.47	6.99
"	"	"	Males	33	57.155	8.93
"	"	"	Females	37	55.86	4.62
Santa Gert- rudis	Ten	"	Both sexes	4	58.50	
"	"	"	Males	2	58.50	
"	"	"	Females	2	58.50	
"	El Capitain	"	Both sexes	26	62.38	8.18
"	"	"	Males	15	63.60	9.11
"	"	"	Females	11	60.73	6.06
Hereford	2 bulls taken together	"	Both sexes	7	60.71	
"	"	"	Males	3	60.33	
"	"	"	Females	4	61.00	
Angus	"	"	Both sexes	4	54.25	
Jersey	4 bulls taken together	"	"	10	45.00	2.02
"	"	"	Males	4	43.75	
"	"	"	Females	6	45.83	

The particulars of bulls sold to farmers are given in the following table:-

Predominant breed of bull	Number sold	Remarks
Santa Gertrudis	43	Either pure bred or nearly so.
Sahiwal	8	Mainly $\frac{3}{4}$ Sahiwal.
Brahman	11	Mostly pure bred.
Jersey	1	By A.I. bull out of creole cow.
Total	63	

The price of bulls was increased to 40¢ per pound during 1967. It is said that some farmers consider the price high. Others however, seem able to obtain a good slaughter price for their old bulls and this more than pays for a younger replacement. Farmers' requirements vary considerably both as regards breed and age; some like them very young whereas others require a bull able to serve a large number of cows immediately.

We have no system for gathering information as to how well the bulls we sell breed. There is no doubt that a considerable number do very well.

The Planting of wind breaks of Pinus caribbean

The Forestry Department established a nursery for producing seedling Caribbean pines at Ebini a few years ago. The planting out of seedlings however, has not kept pace with the production of seedlings; the Forestry Department has not had the resources to do it. The result is that many seedlings have died through over-crowding and the others will soon be too large to plant out at all. In September of this year therefore, some wind breaks were planted within the planted pasture area - between two and three thousand young trees were transplanted. The weather, however, proved dry and as the condition of the young trees was also not ideal, a large number died. We have replaced the dead trees during December.

A United Nations Forestry Officer, Mr. J. Thom who visited the Station in November seemed very favourably impressed by the Caribbean pines planted by the Forestry Department in 1960.

CHAPTER V

THE FIELD AND EXTENSION DIVISION

INTRODUCTION

The staffing situation showed some measure of improvement at around mid year when twelve (12) certificate graduates from the Guyana School of Agriculture were recruited for the extension service after having been given a three weeks' training course in Agricultural Extension Work.

The Field and Extension Division was further strengthened during the last quarter of the year by the addition of:-

- (a) Three (3) members from the Canadian University Service Overseas (C.U.S.O.) who have been assigned duties in the interior districts.
- (b) Credit Agents recruited from certificate graduates of the Guyana School of Agriculture who have been assigned duties in connection with the growing of Blue Belle and other fertiliser responsive varieties of padi.
- (c) Three Agricultural Field Assistants (female) who are certificate graduates of the Guyana School of Agriculture and who have been assigned duties in connection with the Applied Nutrition Programme.

This number of recruits however is far below that which is considered satisfactory to meet the growing needs of the districts, and that which is considered adequate to give the desirable service.

Extension Exercises

Communication Techniques

In order to keep farmers abreast with new techniques in crops and animal production the following communication techniques were employed by district Extension Officers:-

1. Individual Approach

Included under individual approach are all Agricultural, Organisational or regulatory personal contacts:

- (a) Personal Interviews
- (b) Farm Visits
- (c) Individual and Circular letters.

2. Group Methods which Included:

<u>Techniques</u>	<u>Remarks</u>
(a) Meetings	Included Agricultural, Organisational and Regulatory.
(b) Short Courses	Training in special aspects of Agriculture at the Guyana School of Agriculture for Agricultural Project Leaders of Women's Institutes.

Sixteen (16) Project Leaders from Berbice, East Demerara, West Demerara and Essequibo attended the three weeks' training course.

- (c) Method Demonstrations Demonstrations dealing with crops and livestock were given by the district Extension staff, and in some cases by farmers.
- (d) Result Demonstrations Demonstrations dealing primarily with crops were held at the Department's demonstration stations at Mon Repos, Black Bush Polder, and in a few cases on farmers' holdings.
- (e) Field Days Were the most common group technique used; and dealt to a very great degree with such crops as Cabbage, Corn Onions, Irish Potatoes, Black Eye peas, Carrots etc.
- (f) Farm Walks and Field Tours These were directed to visiting progressive farmers who were doing well with dairy animals, pigs and poultry and Vegetable gardens.
- (g) Seminars or Teaching days Dealt with crops and livestock.

3. Mass Media

The various Media used were:

- (a) Booklets, leaflets and pamphlets were distributed
- (b) Film shows were held
- (c) Exhibition and Fairs - National and Local.

Interviews, Farm Visits, Meetings, Demonstrations, Field Days, Film Shows, by the Extension Staff for 1968

Farm Visits	20,634
Personal Interviews	24,654
Individual and Circular letters	1,635
Meetings	838
Short Courses	4
Methods Demonstrations	443
Result Demonstrations	43
Field Days	30
Field Tours and Farm Walk	6
Seminars or Teaching Days	29
Film Shows	28
Booklets, Leaflets etc.	
(Distributed)	11,294
Exhibitions & Fairs	16

Agriculture in the DistrictsCROPSCane Farming by Small Cane Farmers

Weather: More rain fell throughout the cane farming areas in 1967 than in 1968. The heaviest rainfall for the year was in the month of June when an average of 15.77 inches over nine sugar estates was recorded. The heavy rains in June and July caused flooding in some cane farming areas in West Demerara, and in the canals Polder young canes were noticeably affected. The drier weather in the latter half of the year permitted the clearing and preparation of new lands for planting.

Cane Farming Areas:

At present there are six (6) cane farming areas in the country, with approximately three thousand and twelve (3,012) farmers who cultivate sugar cane as follows:

1. Corentyne, Berbice: Rose Hall, Port Mourant, Bloomfield and Letter Kenny. This area has three hundred and thirty-five (335) farmers.
2. East Demerara: Buxton-Friendship, Beterverwagting-Triumph and Plaisance. There are one thousand seven hundred and twenty-seven (1,727) farmers in this area.
3. East Bank Demerara: Mocha, Craig, Hope, Friendship, Garden of Eden, Brickery, Land of Caanan, Pearl Cadcedonia and Covenden. This area has one hundred and eighty-one (181) farmers.
4. West Bank Demerara: Canals No. 1 and 2 Polder, Schoonord, Free and Easy, La Retraite - Stanleytown, L.Oretoire, La Grange, Sisters-Goed Intent, Belle Vue and Chantilly. There are seven hundred and seven (707) farmers in this area.
5. West Coast Demerara: Windsor Forest and La Jalousie. This area has fifty-six (56) farmers.
6. East Bank Essequibo: Le Destin, Ruby, Orangestein, Bushy Park and Farm. There are six (6) farmers in this area.

Farmers from these areas sold their canes to the six (6) Sugar Factories operated by Bookers Sugar Estates Limited viz: Pln. Albion; Pln. Enmore; Pln. La Bonne Intention; Pln. Wales; Pln. Versailles and Pln. Uitvlugt, and the two (2) Factories operated by Demerara Company Limited viz: Pln. Diamond and Pln. Leonora.

National Cane Farming Committee:

The Committee consists of fifteen (15) members as follows:-

- | | |
|---|---|
| (a) Four Official Members - | Messrs. Noel, Bannister, Kennard and Goring. |
| (b) One from The Cane Farming Development Corporation | Mr. E. John |
| (c) Seven from the Districts | Messrs. Rahaman, Thompson, Dias, Duncan, Lawrence, Williams and A. Persaud. |

- (d) One from Demerara Co. Mr. Hailwood
- (e) Two from Bookers Messrs. R. Wilkins and B. Jones.

Functions of the Committee

- (a) To devise programmes and schemes for the promotion and expansion of Cane Farming by small farmers.
- (b) To enquire into and report upon any matter relating to Cane Farming, which may be referred to the committee by the Minister.
- (c) To promote good relations in the Cane Farming Industry.
- (d) To take over on such date as the Minister may direct, the functions of the Sugar Committee appointed by the Governor on 19th June, 1943.
- (e) Generally, to advise and make representations to the Minister on any matter pertaining to the maintenance and development of the Cane Farming Industry.

The first meeting of the Committee was held at the Board Room of the Guyana Development Corporation on Thursday 4th July, 1968. Sixteen (16) other meetings were held during the remaining half of the year and the main subjects discussed were; Appointment of Staff, Finance, the Cane Farming draft Contract, and General conditions. The final draft of the "Cane Farmers Contract (General Conditions) Rules 1968" was approved by the National Assembly on the 4th November, 1968 and became law on that date.

ACREAGE AND PRODUCTION OF FARMERS' CANES 1968

	Acreage planted to cane (Eng. acs.)	Acreage reaped (Spring & Autumn Crop) (Eng. acs.)	Tons Canes reaped	Tons Sugar Produced
<u>BERBICE</u>				
1. <u>ALBION ESTATES</u>				
(a) Rose Hall Village	109.	109.	3866.9	357.
(b) Bloomfield/Letter Kenny	225.	225.	6771.9	607.
(c) Port Mourant United	413.	413.	23777.6	1986.
Total Berbice	747.	747.	34,415.4	2950

DEMERARA

2. ENMORE ESTATE E.C.D.

- (a) Buxton 1038. 1038. 20,231. 1,761.

	Acreage planted to cane (Eng.acs.)	Acreage reaped (Spring & Autumn Crop)(Eng. acs.)	Tons Canes reaped	Tons Sugar Produced
3. <u>L.B.I./OGLE, E.C.D.</u>				
(a) B/V - Triumph	750.	750.	24,505	2,128.
(b) Plaisance	252.	252.	7,455.3	690
Total East Coast	2,040	2,040	52,191.3	4,579
4. <u>WALES, W.B.D.</u>				
(a) Canal No. 2	519	341.2	8358.7	857.6
(b) Free and Easy	140	113.2	3126.6	288.6
(c) La Retraite/ Stanleytown	88	65.7	1799.2	174.
(d) Sisters-Goed Intent	300	274.5	7641.	683.3
(e) Belle Vue	832	832.	26739.2	2562.1
(f) Chantilly	53	53	2088.8	188
Total	1932	1679.6	50253.5	4753.6
5. <u>VERSAILLES, W.B.D.</u>				
(a) Canal No. 1	20.6	20.6	617.9	53.2
(b) Schoon Ord				
(c) Windsor Forest)	196.	93.7	2623.	229.8
(d) La Jalousie)				
(e) La Grange	42.	42.	1418.	124.9
(f) Java	7.	7.	309.8	26.6
(g) L'Orataire	20.	20.	392.3	33.9
(h) Versailles	3.	2.9	102.5	9.2
Total	288.6	186.2	5463.5	477.6
6. <u>UITVLUGT, W.C.D.</u>				
(a) Le Destin	19.5	19.5	525.5	46.
(b) Ruby	14.8	14.8	381.0	33.
(c) Orangestein	41.5	41.5	1211.5	100.9
(d) Farm	6.5	6.5	188.2	16.
(e) Bushy Park	107.	44.	1622.4	135.9
	189.3	126.3	3928.6	331.8
7. <u>LEONORA, W.C.D.</u>				
(a) Canal No. I	875	520.0	18850.5	1593.0
(b) Hague	1.5	1.5	20.0	1.9
	876.5	521.5	18870.5	1594.9

	Acreage planted to cane (Eng.acs.)	Acreage reaped (Spring & Autumn Crop)(Eng. acs.)	Tons Canes reaped	Tons Sugar Produced
8. <u>DIAMOND, E.B.D.</u>				
(a) Mocha	56	56.0	1812.2	169.1
(b) Craig	344	344.2	11732.1	1031.9
(c) Hope	45	45.0	1529.5	132.0
(d) New Hope	48.5	48.5	1932.8	180.6
(e) Friendship	122	122.3	5353.1	491.8
(f) Garden of Eden	505.	504.6	14916.5	1355.1
(g) Brickery	14	14.0	439.8	40.0
(h) Land of Caanan	161	161.2	3022.5	265.0
(i) Sarah Johanna	35.7	35.7	664.0	60.2
(j) Pearl	11	11.0	162.8	12.2
(k) Calcedonia				
(l) Sarah's Hope W.B.D.	29	29.0	907.1	75.9
	1371.2	1371.5	42472.4	3813.6

Cane Farming Development Corporation

The inaugural meeting of the above Corporation was held on the 25th November, 1968. The following persons were elected to represent the Corporation:-

Mr. J. K. Christie	-	(Barclays Bank) Chairman
Mr. C. De Souza	-	Royal Bank
Mr. Bowen Wills	-	Commonwealth Development Corporation
Mr. J. Hailwood	-	Demerara Company
Mr. D. K. Yamin	-	Demerara Company, Secretary
Mr. E. John	-	Sugar Producers Association
Mr. Eusi Kwayana	-	Government Nominee
Mr. Fazal Rayman	-	Government Nominee

The sum of 3.7 million dollars has been subscribed between Barclays Bank, Royal Bank, Commonwealth Development Corporation and Government, which will be made available as loans to farmers and Co-operatives for the cultivation of Sugar Cane. The Sugar Estates will act as Agents for the above named Corporation for the repayment of loans by Farmers and Co-operatives. The loans will be expected to be repaid in five (5) years.

Increased Acreage Under Farmers' Cane in 1968 Compared with Acreages in 1967

District	Village	Acreage	
		1967	1968
1. Berbice	Rose Hall	109	109
	Port Mourant	413	413
	Bloomfield	225	225
	Letter Kenny	-	225
	(Goed Samaritan) Canje	-	130
		747	1102

District	Village	Acreage	
		1967	1968
2. East Demerara	Plaisance	252	252
	Betterverwagting/ Triumph	750	750
	Buxton/Friendship	1038	1038
		2,040	2,040
3. East Bank Demerara	Mocha	56	56
	Craig	319	344
	Hope	94	94
	Friendship	111	122
	Garden of Eden	419	505
	Brickery	14	14
	Land of Caanan	161	161
	Sarah Jonanna	20	36
	Pearl	11	11
	1,205	1,343	
4. West Bank Demerara	Canal No. 1	687	896
	Canal No. 2	400	519
	Free and Easy	118	140
	La Retraite/ Stanleytown	74	88
	Schoon Ord	3	3
	La Grange	42	42
	Toevlugt	-	37
	Sisters/Goed Intent	280	300
	Belle Vue	813	832
	Chantilly	-	53
	West Bank	-	29
		2,417	2,939
	5. West Coast Demerara	Windsor Forest/ La Jalousie	196	196
Hague		2	23
		198	198
6. East Bank Essequibo	Orangestein	42	42
	La Destin	20	20
	Ruby	15	15
	Bush Park	44	107
	Farm Village	7	7
	128	191	
GRAND TOTAL		6,735	7,834

The acreage under Farmers canes between the two Sugar Companies was as follows:

Bookers Sugar Estates Ltd.	-	5938 acres
Demerara Company Limited	-	1896 acres

Total	-	7834 acres

New Areas for Expansion of Sugar Cane Cultivation by Private Farmers

Arrangements are being made with Sugar Estate authorities for the cropping of new areas during 1969, and expansion by private farmers will be centred around East Bank Essequibo, East Bank Demerara, West Bank Demerara and Corentyne.

PESTS AND DISEASES

There were two serious outbreaks of Froghopper on cultivations in Beterverwagting/Triumph and Buxton Areas. There were brought under control by the help given by the L.B.I. Estates which assisted in locating the breeding places of the pest and supplied the Agrocide B.H.C. dust for spraying.

RICE

The unpredictable weather conditions during the year were found to be disadvantageous to rice growers in many areas especially those with non-existent drainage and irrigation facilities or those areas where drainage and irrigation were inadequate.

The Black Bush Polder and the Block III Areas reaped a combined Spring Crop of 8,453 acres less than in the 1967 Spring Crop. This was due to the weather which although better than in 1967 was too wet to permit the early and easy reaping of the crop.

In the West Demerara Area on account of the relatively small size of the holdings which resulted in timely and efficient land preparation and other cultural practices, yields for both the Spring and Autumn Crop was fair.

Pure Strain Seed Padi Schemes

The area brought under Pure Strain Seed Padi for Seed multiplication during the 1968 Autumn Crop was 253.75 acres. This was approximately 48% of the 528.5 acres which were cropped during the previous year.

Autumn Crop Seed padi multiplication of the varieties No. 79, D110 and 60/44 was carried out at the multiplication centres at Cane Grove on the East Coast of Demerara, and at Anna Regina on the Essequibo Coast.

The Blue Bell Seed Padi for distribution was produced at the Pure Line Seed Padi Scheme at Black Bush Polder, on the Corentyne.

For the 1968/1969 Spring Crop thirty (30) acres of Blue Belle were sown at the Black Bush Polder Seed Padi Scheme. This crop has not yet been harvested.

Blue Belle Padi

This variety of Padi which was introduced into the Country during 1967, was first distributed to farmers for Field Trials during the Autumn Crop of 1967. Results at these trials were very encouraging, and where the prescribed recommendations of land levelling, water control, use of fertiliser, and weed control etc. were carried out, yields were between 23-24 bags per acre.

During 1968 the demand for Blue Belle Seed Padi became greater and as a result distribution was more wide-spread. Yields obtained by farmers who were in a position to carry out the required recommendations were satisfactory.

With the knowledge and information for the proper growing of Blue Belle which is being passed on to farmers through demonstrations, Field Days, Farm Visits, Leaflets, Talks etc. by the Extension and Research Staff of the Department the variety is gaining in popularity.

The Blue belle Padi Credit Scheme was launched by the Government during the latter part of the year in an effort to assist farmers of small holdings with credit facilities for Seed, Fertiliser and Weedicide. Farmers are taking full advantage of this Scheme.

Coconuts

Generally, existing cultivations were maintained in satisfactory condition. Cultural practices of weeding and cleaning of cultivations, cleaning of irrigation and drainage trenches, and maintenance of internal drains, received attention at periods whenever weather conditions permitted these operations to have been carried out.

The levels of husbandry and sanitation were generally of a fair standard, and yields on properly attended cultivations were satisfactory.

ACREAGES AND YIELDS OF PURE STRAIN PADI AT THE THREE CENTRES OF PRODUCTION

Year	No. 79		D 110		60 / 44		60 / 47		Blue belle		Total Acreage	Total Yields (140lbs. bags.)
	Acres	Yields 140lbs. bags)	Acres	Yields (140 lbs. bags)	Acres	Yields (140lbs. bags)	Acres	Yields (140lbs. bags)	Acres	Yields (125lbs. bags)		
<u>BLACK BUSH POLDER</u>												
1965	323	6800	24	480	2	58	2	31	-	-	351	7369
1966	45	884	110	1905	100	871	100	768	-	-	355	4428
1967	30.5	527	17	303.	23	102	-	-	40	125	110.5	932 (125-
1968	-	-	-	-	-	-	-	-	73.75	750	73.75	750(125lbs. bags)
1968/1969 Spring crop	-	-	-	-	-	-	-	-	30	-	30	Not yet harvested
<u>CANE GROVE</u>												
1965 Spring	50	817	22	328	-	-	-	-	-	-	72	1145
1965 Autumn	180	3916	60	1666	-	-	-	-	-	-	240	5582
1966	33	778	66	1559	71	1414	73	1254	-	-	243	5005
1967	95	1866	70	1250	26	510	15	293	-	-	206	3919
1968	84	-	50	-	3	-	-	-	-	-	137	-
<u>ANNA REGINA</u>												
1965	89	1805	71	1258	-	-	-	-	-	-	160	3348
1966 Spring	-	-	-	-	36	610	38	544	-	-	74	1154
1966 Autumn	20	323	66	1104	61	796	63	946	-	-	210	3169
1967	81.5	1486	121	2500	9.5	314	-	-	-	-	212	4300
1968	13	238	58	1236	9	278	-	-	-	-	70	1752

DISTRIBUTION OF PURE SEED PADI TO FARMERS DURING 1968

DISTRICTS	VARIETIES					TOTAL
	No. 79 (140lbs. bags)	D 110 (140lbs. bags)	60/44 (140lbs bags)	60/47 (140lbs. bags)	Blue Belle (125lbs. bags)	
Berbice	1,766	1,067	287	50	421	3,591
East Demerara	858	658	113	$\frac{1}{2}$	10	1,339 $\frac{1}{2}$
West Demerara	-	-	-	-	11	11
Essequibo	141	483 $\frac{1}{2}$	295 $\frac{1}{2}$	-	138	2,058
TOTAL	2,765	3,208 $\frac{1}{2}$	695 $\frac{1}{2}$	50 $\frac{1}{2}$	580	7,299 $\frac{1}{2}$

Efforts at rehabilitation of neglected and partly abandoned cultivations were very noticeable, and a fair percentage of the seedlings supplied by the Department were used in this direction.

New planting in blocks of from 1 to 4 acres, and scattered planting on dams and on homestead plots helped to increase the acreage put under coconuts during 1968. The increase in scattered planting was influenced to a great degree by the free distribution of coconut seedlings during National Tree Planting Week.

The discontinuation of the Crop bonus Scheme for new coconut cultivation has probably had an adverse effect upon the rate of establishment of new coconut cultivations in many of the Coastal areas.

NEW AND REHABILITATED CULTIVATIONS

Districts	New Acreages	Rehabilitated Acreages	Total Acreages
Berbice	379	105	484
East Demerara	316	264	580
West Demerara	40	70	110
Essequibo	200	413	613
North West District	290	-	290
Total	1225	852	2077

In addition to the production of Seedling plants at the Central Agricultural Station, Mon Repos, district nurseries at No. 63 and Whim on the Corentyne, Maria's Lodge and La Belle Alliance on the Essequibo Coast, and Hosororo in the North West District, also produced fair quantities of Seedlings to meet the demands of the respective districts.

DISTRIBUTION OF SEEDLINGS

Districts	No. of Seedlings
Berbice	24,206
East Demerara	29,000
West Demerara	5,500
Essequibo	30,650
North West District	17,318
Total	106,674

The heavy losses suffered by Coconut growers through Predial larceny continued. Owners of coconut estates have complained of the additional expenditure incurred, in the hiring of watchmen to minimise their losses.

Trees on farmsteads away from residential areas have been reported to have suffered most through predial larceny.

This problem remains one of the greatest concern to all coconut growers and unless a solution is found there is every indication that the situation will be worsened.

With the exception of the period May-July when heavy and regular showers were had, favourable weather conditions prevailed for the production of copra.

There was a significant increase in the copra produced during 1968 as compared with the production during the three previous years.

Year	Copra Produced Tons
1965	4,636
1966	5,777
1967	4,882
1968	7,013

CITRUS

The demand during the year for budded citrus plants of Oranges, Grapefruits, and tangerines, for cultivations in the Corentyne River, Black Bush Polder, Berbice River, East Bank Demerara, Demerara River, Pomeroon River and the North West District was great.

Every effort was made at nurseries at the Central Agricultural Station at Mon Repos, the Central Horticultural Station at Atkinson, and at districts nurseries in Berbice, Essequibo and the North West District to maintain regular supplies of budded plants.

A fair percentage of the budded plants supplied was used as replacements on old cultivations. In the Black Bush Polder Area eight (8) acres of new cultivation were established. In the North West District the acreage under citrus increased by approximately one hundred (100) acres. In the West Demerara District citrus cultivations in the Banasika Creek, Parika-Hubu, and the Canals Polder Areas have been extended. Increased scattered planting on homesteads and farmsteads can be attributed to a fair measure to the Free distribution of budded citrus plants during National Tree Planting Week.

Increased attention was given by farmers to the fertilising of trees, controlling of insect pests and diseases and general Field sanitation.

No serious outbreak of pests and diseases was reported or observed during 1968. Scales, aphids, sooty molds which were of slight occurrence on most cultivations were kept under control.

A large percentage of the trees in the North West District showed symptoms of mineral deficiency, particularly of the trace elements magnesium and zinc.

SEEDLINGS DISTRIBUTED AND NEW AND REHABILITATED
AREAS PLANTED

District	No. of Plants Distributed	New Areas Planted	Rehabilitated Areas
Berbice	5,289	22 acs.	58 acs.
East Demerara	3,150	9.5 acs.	36 acs.
West Demerara	8,500	30 acs.	70 acs.
Essequibo	2,585	30 acs.	10 acs.
North West District	7,625	100 acs.	10 acs.
Rupununi	856	-	-
Total	28,005	191.5 acs.	184 acs.

CORN

This crop continued to be grown in appreciable quantities in the Riverain Areas of Berbice, Pomeroon, and the North West District. In these areas corn is grown in rotation with ground provision crops after new lands have been cleared of its forest.

The lake areas of the Essequibo, the Demerara River, and the Rupununi produced smaller quantities,

The sixty (60) acres of Hybrid Corn grown as a Field Trial at Mibikuri, Black Bush Polder were harvested during the first week of April. Yields were in the vicinity of 3,500 pounds per acre.

Approximately thirty-five (35) acres of the same plot after having been fertilised, were re-sown with hybrid seed.

The North West District the largest corn growing area in the country produced approximately one and a half million pounds during 1968. Seeds used were of the local variety but with the successful demonstration with hybrid seed, where over 3000 pounds per acre were harvested, it is hoped that farmers will increase their production in the future by the use of Hybrid seed.

Production of corn in the Rupununi is influenced by local demands as there is no outside trade with this commodity. Most of the corn produced is used locally as feed for ranch horses.

COFFEE

Increases in acreage were in the two main coffee producing areas of the Pomeroun River, and the Riverain areas of the North West District.

In the Canals Polder Area of the West Demerara District, attention was given to the replacement of dead and dying trees but no new cultivation was established.

There was a significant decrease in the distribution of Robusta Seedlings from the Hosororo nursery. In 1968 only 1,340 Seedlings were distributed in comparison to 7,000 in 1967, and 20,218 in 1966.

The reduction in Robusta Seedling distribution may be associated with farmers' resistance to the growing of this variety which requires greater care and attention than the more popular Robusta variety.

One thousand five hundred and fifty-four (1554) Liberica seedlings were distributed from the Charity nursery to farmers in the Pomeroun River.

As was customary, selected Liberica seedlings for rehabilitation and for New cultivations in the Pomeroun River and the North West District were produced by the farmers in their respective districts.

The increase in acreage in the Pomeroun River during 1968 was approximately 10 acres of new and rehabilitated cultivations.

The remunerative prices obtained by farmers for coffee beans were an incentive for increased production.

COCOA

There has not been much expansion in the cultivation of cocoa. Existing cultivations in many cases received the minimum of attention, and cultural practices were in some cases observed to have been neglected.

There was much to be desired in the processing techniques and as a result beans on the local markets were of poor quality.

DISTRIBUTION OF CLONAL PLANTS FROM THE
HOSORORO NURSERY

Area of Distribution	Plants Distributed	Acreage Equivalent
Bumbery Hill	200	
Mabaruma	100	
Wauna Land Development Scheme	750	
Hosororo	634	
Mabaruma	71	
Sold to Farmers	64	
Total	1,819	5.5 acres

Sixty-four (64) clonal plants were sold from the Hoosororo nursery during 1968, and 1755 were distributed free during National Tree Planting Week.

GROUND PROVISION CROPS

Flooding of some of the most productive ground provision areas along the coast which occurred after the heavy rains during the months of May to July, as had happened in previous years, was responsible for heavy losses of Sweet potatoes, Tannias, Cassava, Yams etc. Losses were more severe on areas with poor or non existent drainage e.g. East Bank Berbice, West Coast Berbice, Cane Grove, Golden Grove - Nabaclis, Parika and Pomeroun River.

Yields in the North West District, the Pomeroun River, the Essequibo Islands and the Berbice River, the largest ground provision producing areas of the Country were very satisfactory, and during some periods adequately met local demands.

Predial larceny was one of the biggest problem with which ground provision farmers were confronted. This acute problem to which there has been no solution has caused many fertile ground provision areas to be left abandoned or to be converted for sugar cane cultivation.

VEGETABLE GARDEN CROPS

Prices for vegetable garden crops were generally good, and vegetable farmers in most districts have responded to the Market demands by improving their cultural techniques and producing sound and good quality produced.

During the months of March to May, and August to October, when there was an abundance of Tomatoes, Boulangers, Ochro, Bora, Same, Squash and Leafy vegetables, ready markets for their sale were found both in Georgetown and the outlying districts. Supplies were not as plentiful during June and July and November to February, and as a result prices during those periods especially in the Georgetown Markets were relatively high.

The growing of vegetable crops is becoming increasingly popular. This is very noticeable in districts where transportation facilities are available, and ready markets obtainable.

On account of the very favourable prices obtained for cabbage and the readily available markets, farmers are making every effort to increase production wherever conditions are favourable. In the Black Bush Polder area, in the Mara and Berbice River districts, and in the Rupununi, the growing of cabbage is receiving very active attention.

The growing of Onions, Carrots, Beanuts, Black eye peas, Irish potatoes and a few other crops is being emphasised by all district Extension Officers and every effort is being made by the Department of Agriculture to encourage farmers to give consideration to the growing of these crops.

FRUIT CROPS

With the exception of pine apples and bananas which are grown in blocks or on areas of from $\frac{1}{2}$ acre to 2 acres there is no organised large scale cultivation of fruit crops e.g. Mangoes, Guava, Sapodillas, Star apples, Genip, Papaws etc.

Fruit trees found mainly along the coastal areas of Berbice, Demerara and Essequibo are grown in scattered planting in residential areas, homestead lots and on farm lands.

On account of the seasonal nature of production of most of our fruit crops e.g. Mangoes, Guavas, Star apples, Genip, Psidium, Cherries, Golden apples etc. not more than three or four varieties were available on the market at anyone time. There was however hardly any period of glut and as a result prices obtained by farmers were maintained to a satisfactory level. Because of the limited production of most fruit crops there were periods of scarcity when supplies were observed to have been far below local demands.

It is hoped that with the implementation of the National Tree Planting Week which commenced in 1968, and which caters for the free distribution of fruit crop plants, there will be appreciable increase in the number of fruit trees, and that the impact caused by greater production will be felt within 8 to 9 years.

NURSERIES AND DEMONSTRATION STATIONS

The nurseries at Whim and No. 63 on the Corentyne; Suddie and Maria's Lodge and La Belle Alliance on the Essequibo Coast; Hosororo in the North West District and St. Ignatius in the Rupununi were maintained mainly for the propagation of planting materials, especially fruit crop plants for distribution in the respective districts.

Planting materials produced at district nurseries on the Corentyne, and on the Essequibo Coast were supplemented by production from the nurseries at the Central Agricultural Station, Mon Repos; the Botanic Gardens, Georgetown and the Central Horticultural Station Atkinson. Supplies to East and West Demerara were also fully met from these propagating centres.

DEMONSTRATION STATIONS(a) Lesbeholden Demonstration Station, Black Bush Polder

This station was fully developed in 1968. The five (5) acres which were under bush and swamp were cleared, drained and prepared for cropping.

Demonstration plots of Cabbage, Irish potatoes, Peanuts, Onions, Carrots, and Black eye peas which were laid down in 1968 were used to a great advantage for educating farmers on cultural practices required by these crops. Teaching Days, Field Days, Method and result Demonstrations are held and given at this Station.

DEMONSTRATION PLOTS AT LESBEHOLDEN
DEMONSTRATION STATION

Crop	Acreage Cultivated	Yields in lbs.	Unit Price per lb.
Cabbage	$2\frac{2}{3}$	3,464	25¢
Irish Potatoes	$\frac{1}{4}$	200	10¢
Peanuts	$\frac{1}{3}$	299½	32¢
Onions	$\frac{1}{3}$	1,224	12¢
Carrots	$\frac{1}{8}$	175	38¢ - 45¢
Black Eye peas	1	139½	24¢

(b) Mara Demonstration Station

This Station did not fully serve the purpose for which it was intended. The failure was due to the absence of an Agricultural Field Assistant to carry out supervisory work for the period March-September.

Maintenence work on the citrus, Cocoa and Fodder plots were carried out with a minimum labour force.

(c) Hosororo Experimental Station

Approximately 90 acres of the 423 acres were under cultivation.

On account of the limited funds which were available, only normal maintenance operations of weeding, fertilising etc. could have been carried out on 31 acres of citrus, 1 acre of Robusta coffee, 2 acres of grafted pears and five acres of hill side pasture. No maintenance work was done of the 51 acres of cocoa.

The demonstration function of the Station is very unsatisfactory due to the lack of adequate attention to the cultivations.

(d) Wauna Demonstration Plot:

The investigational work on fertiliser requirements of crops to be grown and the feasibility study on the growing of such crops as Tomatoes, Carrots, Pigeon peas, Cabbages, Water melon etc. suffered considerably as a result of the lack of a Research Assistant for a very long period. The situation has however improved with the posting of an Assistant to Wauna around April and an Agricultural Assistant, a Canadian University Service Overseas (C.U.S.O.) volunteer in September.

Work at the demonstration station may be divided into:

- (i) Growing of Permanent Crops
- (ii) Growing of short term crops
- (iii) Using Soil Conservation techniques.

Permanent crops of Cocoa, Citrus, Coconuts, and Avacado pears are growing satisfactorily. Trees of Cocoa and Citrus gave their fruit crop.

Bananas and Plantains used for under cropping succumbed to Moke Disease, and had to be destroyed.

A fertiliser trial plot of Pineapples was laid down, and investigational work on the growing of Black pepper was also set up.

Soil conservation work continued uring 1968. The Pangola grass established as small plots has now completely covered the area under coconuts. The Kudzu has proven to be an exceptionally good cover crop.

As a contour barrier citronella grass has shown its suitability against Elephant grass, which now appears to be a weed problem.

(e) Kumaka/Kwebanna Demonstration Plot

Work continued during 1968 on the Department Plot at 5 miles Kumaka/Kwebanna Road. Both Coffee and Coconuts have done well.

Plots of Black pepper, Cassava and Plantain were tried with varying degrees of success.

(f) School Gardens

School gardens work in the three districts of Berbice, East Demerara and Essequibo was concentrated on gardens at Schools which were selected to carry out the programme in connection with "Applied Nutrition."

The schools selected were Manchester Church of Scotland and Rose Hall Church of Scotland on Corentyne, Berbice; Ann's Grove Methodist on the East Coast Demerara, Lodge Government and Ruimveldt Secondary in the Georgetown cum annexis area, Diamond Government on the East Bank Demerara, Anna Regina Government and Queenstown Methodist on the Essequibo Coast.

Fencing material, planting material, fertilizers, tools and equipment were made readily available to these schools in order that progress will not be retarded through untimely operations and lack of materials.

The Agricultural Field Assistants were always available for technical assistance.

The condition of other school gardens were on the whole satisfactory, they continue to serve as a teaching aid for students.

LIVESTOCK

Beef Cattle

The conversion of pasture areas for the growing of rice and to a lesser extent sugar cane, along with the high degree of mechanisation of the rice industry which has eliminated the use of animals for ploughing, have caused a considerable reduction in the beef cattle population along the coastal areas.

Beef production was concentrated on the Riverain areas of Berbice, Canje, Abary, Mahaicony and Mahaica, and in the Rupununi Savannahs. The Rupununi district continued to be the main source of supply of beef for the Georgetown markets.

The beef cattle population of the Rupununi during 1968, was around 50,000 heads, of which approximately 29,000 heads were owned by the Rupununi Development Company.

Throughout the country beef cattle rearers and ranchers have shown very keen interest in the rearing of suitable beef types animals, and as a result there was a great demand for stud bulls from the Government Livestock Farm at Mon Repos, and from the Ebini Livestock Station.

At the St. Ignatius Livestock Station, pure and graded Stud bulls of the Brahman and Santa Gertrudis Strains were bred for distribution to ranchers in the Rupununi.

Dairy Cattle

Limited grazing areas continued to be a problem to all dairy farmers along the coast, and as a result were limitations to the number of animals kept by dairy farmers; and this has resulted in acute shortages of milk in many areas.

In the Berbice district milk production was centred in the Abary Creek; the Block III Pasture, and the cattle pasture at the rear of Black Bush Polder. The milk produced in these areas was sold within the villages on the Coast and in New Amsterdam. However, most of the milk distributed in New Amsterdam was produced in the Lower Corentyne, Canje and East Bank Berbice Areas. The milk from the Abary in addition to its distribution in the villages around was partly sold for supplying to the milk pasteurisation plant in Georgetown.

The milk cooling plants installed at Mahaica and Mahaicony continued to be an asset to milk producers in the Creek areas.

The better type animals of pure and graded Holstein were concentrated in the La Penitence, Kitty and Bel Air areas, where the system of stall feeding is being practiced.

In the West Demerara District dairy animals were reared on small scale holdings, and grazed along dams and uncropped rice areas which have been put aside for this purpose. The milk produced was sold partly in Georgetown and partly in the district.

Artificial Insemination

Wherever this service was available dairy farmers with stall kept animals have taken full advantage of having their animals inseminated in order to improve the breed type.

On the Essequibo Coast farmers have frequently complained of the irregularity of the service and have been showing preference for the use of the Stud bulls.

Pigs

Generally pig rearers have maintained their keen interest, and have continued giving attention to the production of animals of good conformation in order to meet the standard requirement by the Guyana Marketing Corporation.

With the appointment during the year of an Agricultural Officer (Pig Production) who was been charged with the duties of examining and advising on the improvement and development of the Pig Industry, and who has held several Seminars, Field days, Pig farm walk, Film shows etc. Added emphasis was laid on:

- (i) Improved housing and sanitation.
- (ii) Better management and husbandry.
- (iii) Proper feeding.
- (iv) Use of proper breeding stock.
- (v) Arrangement of a proper breeding programme.

Sheep and Goats

As usual this type of livestock received no special care and management, except cheap and often inadequate housing. Animals were allowed to forage whenever they could, and on account of the very large areas over which they were allowed to find their feed they have succeeded in surviving.

Because of no organised breeding programme, animals along the coastal areas have suffered a deterioration in size and physical condition, with a high mortality rate as a result of inbreeding.

Heavy stomach worm infestation was the main problem with sheep and goats.

There was no organised market for mutton; but ready sales were obtained for rams and barren ewes during the festive seasons of Christmas and Phagwah.

Thirteen rams for breeding were distributed from the Government Livestock Farm, Mon Repos.

Poultry

This industry is now well established. There was a marked increase in the production of poultry meat, due to an increase in the number of broiler rearers; along with an increase of their flock by existing rearers.

Supplies were at all times in excess of demands and as a result competitive prices were obtained by purchasers.

Broiler producers on the Upper Corentyne, West Canje, East Bank Berbice and West Coast Berbice have made a significant contribution towards fulfilling market demands in the Berbice district.

The markets in Georgetown and its environs received their supplies from producers on the East Bank and East Coast Demerara.

Egg Production

There were shortages during certain periods of the year, more noticeable during the Christmas season when demands had substantially increased. The fall in production could be attributed to the moulting season, and to the change in weather conditions.

Prices which varied from 72¢ to 84¢ per dozen for medium size eggs and 96¢ - 108¢ for large eggs were considered fair and reasonable.

The deep litter system or rearing for both meat and eggs was adopted by the majority of producers.

DISTRIBUTION OF BREEDING STOCK DURING
1968

District	Beef Cattle		Dairy Cattle		Sheep; Piglets; Goats					Chicks 3 weeks old
	Bulls	Heifers	Bulls	Heifers	Cows	Ram	Ewe	Weaner	Buck	
Berbice	10	-	1	-	-	4	-	60	-	4,874
East Demerara	-	-	1	3	-	9	-	93	1	16,093
West Demerara	-	-	-	-	-	4	-	48	-	4,755
Essequibo	-	-	-	-	-	2	-	7	-	9,083
North West District	-	-	2	3	-	-	-	21	-	2,461
Rupununi	6	14	-	-	-	5	9	-	-	
Total	16	14	4	6	-	24	9	229	1	37,266

St. Ignatius Livestock Station (Rupununi)

Cattle

At the beginning of 1968 four (4) herds; two (2) pure bred Brahms; one (1) Pure Bred Santa Gertrudis and one (1) mixed which consisted of 238 heads, were kept for the production of pure bred and graded breeding animals for distribution to ranchers. Six (6) stud bulls and 14 breeding heifers were distributed during the year.

The selling price of thirty cents (30¢) per lb. live weight was considered too high by farmers and as a result twenty two (22) young stud bulls remained unsold at the Station during 1968.

Six (6) pure bred Brahman Stud bulls were farmed out on loan to ranchers during 1968.

Horses

The breeding programme which was aimed at improving the working horses used on the ranches was tremendously affected with the death of the Pure bred Arabian Stallion. Ranchers have reverted to the use of selected Rupununi type stallions.

Sheep

The station's sheep population continued to suffer as a result of the limited available grazing areas. The condition of the animals, which was due to heavy stomach worm infestation having had to use the same pasture over long periods, was far from satisfactory. Lambs were weak at birth, and stunted during growth, which resulted in a high mortality rate.

Amerindian Cattle Improvement Scheme

Of the six (6) Schemes launched at Karasabai and Annai in the South Savannahs, Awarawanuawa Aishalton, Sand Creek, and Poratinau or Ambrosa in the North Savannahs, those of Karasabai Awarawanuawa, and Potarinau have been given fair attention by the villages concerned and have made satisfactory progress. Those at Annai Aishalton and Sand Creek have been some what neglected. The failure was due to:-

- (i) Poor Supervision by the Village Council.
- (ii) Lack of Proper Paddocks.
- (iii) Little knowledge of management and Animal Health.

Lethem Abattoir

Returns for the Lethem Abattoir for 1968
were as follows

Months	No. of Animals Slaughtered	No. of pounds beef
January	486	200,485
February	422	169,932
March	336	136,263
April	423	183,354
May	435	178,846
June	349	136,974
July	387	174,153
August	405	159,476
September	412	166,681
October	486	212,794
November	601	217,536
December	560	204,584
Total	5,302	2,141,078

Production and Distribution of Livestock during
1968 from St. Ignatius Livestock Station

Cattle	Stock at end of year	Produced	Sold	Loaned	Died	Slaugh-tered	Returned from revolving scheme
1967	238	55	2	7	6	7	9
1968	241	41	20	6	24	8	17
<u>Horses</u>							
1967	44	7	-	-	5	-	-
1968	49	11	-	-	6	-	-
<u>Sheep</u>							
1967	71	58	39	-	13	31	
1968	68	57	15	-	17	28	

BEE KEEPING

Although the rainfall of 93.05 inches recorded at the Botanic Gardens was 24.84 inches less than in the previous year weather conditions were not favourable to bee keeping, as heavy rains fell during those periods which should normally have been dry. This had the effect of first delaying the start of the honey season and then greatly hampering it with the approach of the following rainy season. It was therefore the third successive year in which unfavourable weather conditions were experienced by bee keepers. This set back along with a declining bee pasturage have caused a drop in the honey production, and a loss of interest with some beekeepers.

In Berbice and Demerara there was a marked decline of the Industry; but in the Essequibo some progress was achieved and 12 new apiaries were established.

Beekeepers, Apiaries and Colonies in the
Three Counties

Particulars	Demerara	Berbice	Essequibo	Total	In-crease	De-crease
Beekeepers	224	77	51	352	-	3
Apiaries	228	81	60	369	4	-
Unsupered Colonies	112	84	64	260	29	-
Supered Colonies	794	324	260	1378	-	134
TOTAL COLONIES	906	408	324	1638	-	105

Production

Weather conditions were against the Courida and the Coconut palms, our main source of nectar. It was those apiaries which were located in fruit producing districts, and in those areas where the bitter tally vines and the Black Sage Shrubs were allowed to flourish, that helped to maintain production.

It can be estimated that 1000 colonies managed to produce an average of 60lbs. of honey each i.e. a total production of 60,000 lbs. for the year.

The beeswax produced was estimated at 1000 lbs. Both honey and beeswax were in short supplies throughout the year, and in order to meet local demands; honey was imported from Canada and Australia by some business firms.

Queen Breeding and Demonstration Apiary, Botanic Gardens

All Colonies of bees were given regular attention. The breeding of Queen bees suffered a severe set back as a result of unfavourable weather conditions, staff shortage, and destruction by Kiskadees. Only 25 queens were sold during the year from the Department's Apiary.

Demonstrations to prospective bee keepers and educational Organisations were given at the Apiary during the year. Ten (10) nucleus colonies were distributed to beginners.

Bee keepers in some areas were taught the art of raising queens to be used either as replacement or for establishing new hives.

Inspection of Apiaries and Dissemination of Information

Visits to apiaries of beekeepers, and school apiaries were made when new techniques of queen bee breeding, siting of apiaries, distribution of honey plants etc. were discussed.

Training courses, Seminars, Demonstrations etc. were held during the year in order to keep beekeepers abreast with New techniques and management.

Guyana Beekeepers Association

Close collaboration between the Association and the Ministry of Agriculture and Natural Resources were maintained.

The Association has proposed to launch a country wide campaign in 1969 to whip up interest in beekeeping.

At the Association's Annual General Meeting held at Mid-year, the Hon. Minister of Agriculture, the Association's Patron, delivered an impressive address.

At the end of the year there were 74 financial members on roll.

Communications Office

The formation of a New Ministry of Information in 1967 resulted in the Equipment, personnel etc. being transferred to this Ministry from the Information Division of the Department of Agriculture, which then ceased to function. The division is now reduced to a communications office.

The achievements of this office during the last two months of 1968 were:-

- (i) Outdated leaflets on various agricultural subjects were brought up to date.
- (ii) Thirty three press releases were made which covered such topics as Visits to Districts by Extension and Specialist Officers, Distribution of Plants and Livestock, Information on Field Days and Seminars etc.
- (iii) Publication of the Agrinews - a monthly Ministry Newsletter which were circulated to all technical and Senior Administrative staff members, and contained information on experiments. Field Days, Seminars, Fairs, and other items of district news.
- (iv) Supplied information to the Agricultural Programme Farm Bulletin e.g. hints on land preparation, use of artificial fertilisers, aspects of cattle to poultry rearing etc.

It is hoped that the Communication Office of the Ministry of Agriculture will be fully equipped in 1969, having the necessary personnel and equipment so that it can give the service required by the Department.

BOTANIC GARDENS

Nursery

Propagation of both economic and ornamental plants was maintained at a very high level; and every effort was made to meet demands promptly. A large number of ornamental plants were distributed free of costs for planting on Government gardens and compounds in Georgetown, in school compounds, and on compounds at district stations, and Government Institutions.

Twenty-five thousand (25,000) fruit crop plants of various types e.g. Sapodilla, Guava, Golden Apple, Sugar apple, Custard apple, Malacca apple, Soursap, Cashew, Bilimbi, Carambola, etc. were propagated and distributed during National Tree Planting Week.

Flower Gardens

Rehabilitation work during the year consisted of reconstructing the cycad bed on the 105 road. The area adjoining the cycad bed was cleared and built up, drained etc. and planted with roses and ground archids. On numbers 1, 2 and 7 Islands clearing, removal of wild plants, and dead growth, and thinning of the dense growth of palms, also received attention.

Maintenance work of weeding of beds and drains, pruning and supplying of plants, and other cultural practices were given regular attention.

Children's Play Ground

General repairs to all equipment on the Childrens' playground were carried out. The Bandstand and cribs around were repainted.

Park Lawns

Lakes, Trenches and Chairs in the area were kept in good condition by regular cleaning. Trees were pruned and cleaned and kept free from parasite.

Roads

For the first eight (8) months of the year the main and lateral roadways were in a state of disrepair; and had reached such a deplorable condition that they were impossible to vehicles. Work of rebuilding and surfacing however commenced around September 1968 and is still in progress.

Identifying and Supplying of Botanical Specimen

A large number of plants have been labelled and their location recorded.

In keeping with the Botanical Exchange Programme, Botanical Specimens and Seeds were supplied to several International Institutions, and to individuals both local and foreign.

Imported Plant and Plant Products Examined during 1968

Type of Products	No. of Packages	Type of Products	No. of Packages
Garlic	21,716 pkgs.	Popcorn	530 pkgs.
Chick Peas	13,199 "	Dwarf Coconuts	51 "
Ginger	551 "	Corn	203 "
Black Pepper	656 "	Bulbs	48 "
Carraway Seeds	89 "	Cocoa Beans	12 "
Fenugree "	368 "	Pine apple suckers	151 "
Mustard "	241 "	Eschallott	2 "
Cummin "	1,470 "	Nectarines	15 "
Coreander "	3,171 "	Live plants	40 "
Tapioca "	2,463 "	Sugar Cane Cuttings	5 "
Sago "	581 "	Ground Provisions	195 "
Methi "	10 "	Grapes	55 "
Cardamon "	1 pkg.	Carrots	548 "
Fennel "	107 pkgs.	Celery	169 "
Vegetable "	113 "	Water Cress	1 pkg.
Bird "	1,670 "	Tomatoes	75 pkgs.
Mamora "	10 "	Lettuce	163 "
Rice "	2 "	Plums	45 "
Tobacco "	1 pkg.	Beets	18 "
Linseed "	1 "	Radishes	88 "
Aniseed "	15 pkgs.	Turnips	75 "
Frozen Vegetables	491 "	Cabbages	148 "
Pigeon Peas	820 "	Lintils	3 "
Cloves	18 "	Apples	351 "

Type of Products	No. of Packages	Type of Products	No. of Packages
Areca Nuts	10 pkgs.	Green peppers	56 pkgs.
Peas & Beans	81 "	Hay	24 "
Cinamon	250 "	Bark	24 "
Black eye beans	1,145 "	Mace	1 pkg.
Cotton Seed Meal	1 pkg.	Chellie Powder	40 pkgs.

Exported Plant and Plant Products Examined During 1968

Type of Products	No. of Packages	Type of Products	No. of Packages
Pumpkins	1,445 Pkgs.	Fruits	700 pkgs.
Yams	396 "	Mixed Fruits	232 "
Live plants	19 "	Dried weed	23 "
Green Vegetables	8 "	Vegetables Seeds	2 "
Ornamental Seeds	1 pkg.	Sugar Cane Cuttings	3 "
Thyme	7 pkgs.	Botanical Specimens	1 pkg.
Wallaba Poles	350 poles	Greenheart piles	26 pieces
Hewn Greenheart	165 pieces.		

Town Gardens

List of gardens and compounds which were supervised and maintained by the Curator, Botanic Gardens:-

Guyana House

Prime Minister's Compound

Chief Justice Compound

Attorney General Chambers Compound

Law Courts Compound

Carnegie School Compound

Technical Institute Compound

Ministry of Agriculture Head Office Compound

Magistrate Courts Compound

Employment Exchange Compound

National Registration Centre Compound

Ministry of Works and Hydraulics Head Office Compound.

Distribution of Vegetable and Other Seeds

Type	Sold	Distributed Free
Mixed Vegetable Seeds	10,164 packets	400 packets
Tomato Seeds	862 "	100 "
Onion Seeds	130 "	29 "
Cauliflower	11 "	
Black Eye Peas	763½ lbs.	
Total	11,167 "	529 "
	763½ lbs.	

CHAPTER VI

Fisheries Division

DESCRIPTION OF FISHERIES

Marine Fishing is pursued in the following areas:

(1) Coastal or Offshore

That is on the broad shallow flats which fringe the Colony's 300 miles coastline on which the fish tend to move in unison with the mudflats as they are built up and washed away by the action of the tide and currents.

In this area the principal methods employed are:

- (a) Pin Seines
- (b) Gill Nets
- (c) Cadell
- (d) Chinese Seines.

Pin Seines are owned by small independent investors who operate boats about three to eighteen tons, and fish on the flats with nets about six feet high and two thousand yards long which are staked into the mud at high tide. As the tide recedes the seine allow the water to pass out, but not the fish and at low tide both the seine and the fish are left on the mud flats.

Very few of these are open boats and depend on the wind for propulsion. These are equipped with portable ice-boxes. The majority have sheltered decks and are powered by in board engines of diesel design of 18-31 horse power. They are equipped with built in ice boxes insulated with jablite.

Gill Nets are essentially a completely submerged vertical curtain of netting, the upper end of which is buoyed by floats, distributed equi-distantly along its entire length and its lower end weighed by lead.

There has been a notable improvement in the design, construction and propulsion of boats using this method of fishing. In the past they were of the quarter deck design and powered by out-board engines, now they are completely decked and powered by in board engines.

Cadells are lines of about two miles long from which short pieces of lines with hooks are attached at regular intervals.

The height at which the line fishes is regulated by the adjustment of a series of floats and sinkers which are placed at intervals of fifty hooks.

This method of fishing has almost completely disappeared from the fishing scene and has been replaced by Gill Nets.

Chinese Seines are funnel shaped nets with a mouth of about 14 x 20 feet stretching as a bag about 50 feet long with a smaller meshed net at the end. It is set on a frame of poles in the river and estuary and fish and shrimp are caught as the action of the tide forces them through the mouth of the net.

(2) DEEP SEA FISHING grounds off the Coast of the Guyanas resorted to by the snapper boats for red snapper and grouper are on the seaward edge of the Continental Shelf in thirty to sixty fathoms of water and on the beginning of the Continental Slope in sixty to one hundred fathoms.

All fishing is done from the decks of the snapper boats by hand lines comprising of eleven to fifteen hooks.

There are now only five (5) boats engaged in fishing for snapper and grouper. Formerly there were seventeen, but local enterprise in this aspect of fishing has declined considerably.

Trawling is divided into two groups as follows:-

- (a) Trawling for Shrimp.
- (b) Trawling for Fish.

Trawling for Shrimp is carried out along the north-east coast of the South American Continent, from twenty-five (25) fathoms north of the Essequibo River mouth to a point beyond the Oyapock River in Brazil.

There are at present two companies in Guyana, Trawling for Shrimp. They are as follows:-

(1) The Georgetown Seafoods with a fleet of fifty-eight (58) trawlers of between forty and fifty tons nett, powered by engines of between 250 and 330 H.P.

This Company has a packing and freezing plant with a daily freezing capacity of 80,000 pounds.

(2) Guyana Industrial Holdings with a fleet of eighty five (85) Trawlers.

This Company has two freezing plants, one with a capacity of 60,000 pounds and the other with a capacity of 40,000 pounds.

The Shrimping Fleet operated by the Georgetown Sea Foods was paralysed by a strike which lasted for several weeks. As a result the production of Shrimp suffered and only 5,182,330 lbs. were produced as compared with 6,350,420 lbs. during the previous years.

TRAINING

Two members of the Fisheries Division, Messrs. George Bailey and D. P. Singh were sent to Barbados to be trained as Junior Fisheries Officers, under the United Nations Caribbean Fisheries Development Project.

Mr. N. Mc Arthur resumed duties in February 1968, after completing a course in Marine Fisheries in Seattle, U.S.A.

It is reported that Mr. J. Mc Almont our prospective Fisheries Officer Marine is doing well at the Humbolt State College, California.

CONFERENCES

The following conferences were attended by the Permanent Secretary and The Fisheries Officer during the year.

- (1) The third Liaison Officers' Meeting of the UNDP/FAO Caribbean Fisheries Development Project held in Barbados from October 1 - 4, 1968.
- (2) The First meeting of the Working Party on the treatment of fish and other Sea products in CARIFTA Territories, held in Barbados on 21st and 22nd November, 1968.

NEW AMSTERDAM FISH CENTRE

During the year the Government of Guyana, with the Canadian Aid commenced work on the construction of the New Amsterdam Fish Centre. Work is progressing satisfactorily and it is anticipated that the centre will be completed before the end of 1969.

The Division continued to introduce and demonstrate the use of modern fishing gear including synthetic floats and twines and lighted buoys.

It is hoped that in the near future the entire fishing fleet will be equipped with nets made from synthetic twines and that cotton twines will be used only for making cast nets.

The Ministry of Agriculture is encouraging the Local ownership of trawlers and towards this end has arranged for the Butters' brothers to be granted loans to assist in the purchase of two trawlers.

Mr. L. Butters is operating a fishing trawler the "Chikena" and is supplying the Guyana Marketing Corporation with fish. While Mr. B. Butters is operating a shrimp Trawler and his catches are handled by the Guyana Merchants Ltd.

It is hoped that more enterprising Guyanese will avail themselves of the opportunity afforded them under this programme and acquire Trawlers.

Financial assistance continued to be provided to Fishermen by the way of Duty Refunds. The total amount refunded during the year was one hundred and five thousand dollars.

LANDING SITES

At Mahaica a landing site to facilitate the landing of catches was completed and officially opened by the Honourable Minister of Agriculture and Natural Resources.

At Rosignol the Blairmont Estates Ltd. granted permission to the Rosignol Fishermens' Co-operative Society to utilise a plot of land on the fore shore adjacent to the Rosignol Ferry Stelling for the purpose of building shore facilities. The Society has obtained permission from the Sea Defence Board to build on the site and has already paled off and empoldered the area. It is hoped that funds will be provided in the 1969 Development Estimates for the construction of Rural Landing Sites.

Lots 78 - 79 Local Authority has offered to provide the Upper Corentyne Fishermen's Co-operative Society with a plot of land which is considered suitable for providing shore facilities.

The Division continued to make representation on behalf of fishermen whose seines and other equipment were damaged by other vessels and to arbitrate in disputes among fishermen over the right to occupy fishing grounds.

During the year there were twenty (20) such reports and in most of the cases the fishermen were compensated for their loss and the disputes amicably settled.

STATISTICS

There were one hundred and forty three (143) trawlers and over eight hundred (800) small boats in operation during the year.

The Georgetown Sea Foods landed 5,182,330 lbs. of shrimp and exported 5,362,156 lbs.

Guyana Industrial Holdings Limited landed 3,978,671 lbs. of Shrimp and exported 3,773,087 lbs.

The Guyana Marketing Corporation purchased 1,234,937 lbs. of Fish valued \$333,231.76. This includes 590,819 lbs. landed by the 'Chikena' a local trawler owned and operated by Mr. Butters.

Fish passing through the Municipal Markets in Georgetown amounted to 21,120,530 lbs.

Guyana Industrial Holdings purchased 25,395 lbs. and exported 20,880 lbs. of fish glue.

Mr. Beresford purchased 42,581 lbs. and exported 40,284 lbs. of fish glue.

FISHERIES CO-OPERATIVES

Attention was focused on six co-operatives during the year with the hope of consolidating these organisations.

2. There were substantial increases in the share capital and most of the outstanding loans were repaid.

3. Groups were involved in self-help activities so as to assist in providing themselves with better landing facilities.

4. A supply of twines was obtained locally and was distributed among some of the groups. The result was that orders were placed overseas and it has been anticipated that goods will be sold to members at a cheaper rate, when arrived.

5. Several committees were guided in the management of their affairs.

FISHERIES DIVISION INLAND - ONVERWAGT FISH CULTURE STATION

Throughout the year each of the ten ponds was silted up to such an extent that it was impossible to stock them with fish. This was due to the gradual accumulation of silt over a period of about eleven years, (1957-1968).

At present after the intake of high tides the average maximum depth of water obtained is about one foot. The water disappears after about one week mainly through evaporation and leaky kokers, the ponds are then left dry until the next high tide. High tides capable of flooding ponds occur every two weeks.

The intake Canal which supplies the ponds with water is also silted up and presently a mud bar runs across the canal and hampers the water flow. As a result of these conditions the supply of water and fish on which the Station is entirely dependent is cut to the barest maximum. This is not sufficient for the growing of fish in ponds.

The ponds and the intake Canal must be re-conditioned before any type of fish culture is attempted.

TILAPIA DISTRIBUTION

Throughout the year Tilapia fingerlings were collected from the surrounding swamps and stored in concrete trough then transported to Georgetown for distribution to farmers' ponds and swamps in different parts of the country.

Most of the ponds are too large for the collection of fingerlings and also they are stocked with many types of fishes which prey on the young Tilapia. So it is clear that presently they are not any ponds capable of breeding Tilapia for the purpose of distribution.

In November and December, nine concrete tanks - 10' x 3' x 2½' were constructed, these tanks are capable of holding a maximum of 2,000 - 2" Tilapia fingerlings each for an unlimited period. Four 350 gallons tanks were put up to supply these tanks with water. The area in which these concrete tanks are placed have been enclosed with expanding metal fencing. Attempts are being made to breed fish in these tanks.

12,900 fingerlings were distributed to farmers' lakes and other suitable bodies of water.

Fish Cropping - the following fish totaling 186 lbs. and valuing \$76.50 were cropped this year.

Queriman	-	90 lbs.
Bashaw	-	23 lbs.
Tilapia	-	46 lbs.
Snook	-	15
Long Cudja	-	5 lbs.
Cuffum	-	4 lbs.
Grouper	-	3 lbs.

Rainfall collected at the Met Station at Onverwagt was:

January	-	
February	-	7.12"
March	-	5.85"
April	-	13.52"
May	-	9.16"
June	-	11.16"
July	-	6.90"
August	-	1.81"
September	-	3.10"
October	-	0.76"
November	-	4.62"
December	-	1.52"
		<hr/>
Total	-	<u>62.52 inches</u>

Average Evaporation for the same period was 6.66 inches per month.

CHAPTER VII

THE WEATHER

The collection of meteorological data is now the responsibility of the Ministry of Works and Hydraulics, but since the weather plays such an important part in agricultural production, this chapter is being included. The statistics have all been presented by him.

A large amount of meteorological data is available from different parts of the country. However, in this chapter statistics are given from a few selected Stations. These figures will tend to give the overall weather situation for the country as a whole, and were prepared by Mr. F. D. Frassinetti, Meteorologist-in-charge, Ministry of Works and Hydraulics.

The following is a generalised description of the weather during 1968.

Rainfall

The total rainfall for the year at the Georgetown Meteorological Station, Botanic Gardens, was 93.05 inches as compared with 117.89 inches in 1967. The average over the past 88 years (1880-1967) was 91.25 inches.

The pattern of the wet and dry seasons was not too well defined due to the relatively high values during February, March and April, and particularly the low value of May (8.19 inches) as compared with 25.19 inches for this month in 1967. The long dry season was well defined with reading for August, September and October 3.79, 4.53 and 3.61 inches, respectively.

Rain fell on 217 days of the year compared with 206 days in 1967. The highest rainfall for any one day was 3.36 inches which occurred on 25th June, 1968. This was well below the record of 8.32 inches on 9th April, 1890.

The rainfall figures for the interior districts are as follows:-

St. Ignatius	-	Rupununi	-	83.14 inches
Ebini	-	Berbice	-	85.69 inches
Mazaruni	-	Essequibo	-	102.63 inches
Matthews'Ridge	-	North West District	-	94.59 inches (average for 11 months)

These values are comparable with each other and fairly close to the values of the previous year.

Taking St. Ignatius as an example of the Rupununi area, it is possible to recognize that only one wet season appears - April to July, with rainfall fluctuating between 12.75 inches in May to 21.39 inches in July. With 7.44 inches in August and 6.08 inches in September, a gradual change over to the dry season could be seen, which for the remaining months of the year were below the value of 1.67 inches in November. It is interesting to note the high value of rain which fell at St. Ignatius on 21st April, 1968, when 8.22 inches were recorded in 24 hours.

Temperatures:

The highest temperature for the Coast was 90.7°F and occurred on 22nd October, 1968. This was well below the record of 93.0°F on 22nd September, 1955. The minimum for Georgetown was 70.0°F .

At St. Ignatius in the Rupununi a maximum of 69.9°F were obtained. The Rupununi tends to be more continental in character.

MINISTRY OF WORKS AND HYDRAULICS
HYDROMETEOROLOGICAL SERVICE
CLIMATOLOGICAL SUMMARY

Station: Botanic Gardens Lat.: 6°49'N Long: 58° 11'W No.: 81001 Year: 1968

Elevation of station above M.S.L.: 0' 7"

Computed by: _____

Checked by: _____

Month	Air Temperature							Relative Humidity (%)		Wind Speed	Total	Rain fall	
	8 a.m.	2 p.m.	Mean		Mean	Absolute		8 a.m.	2 p.m.			Max. in one day	No. of days
			Max.	Min.		Max.	Min.						
January	78.5	80.9	82.6	74.4	78.5	84.2	71.5	84	79		5.49	0.93	20
February	78.1	81.2	82.5	74.2	78.3	83.7	70.2	83	74		8.87	2.74	17
March	79.3	82.1	83.3	74.5	78.9	84.3	70.0	77	72		7.31	2.24	13
April	78.9	82.2	83.7	74.4	79.1	87.1	72.8	86	76		10.30	2.34	14
May	79.7	83.4	84.4	74.1	79.3	86.5	71.6	84	73		8.19	1.29	23
June	77.9	82.8	83.8	73.9	78.9	86.0	72.0	90	77		17.41	3.36	26
July	78.6	83.6	84.5	74.2	79.3	86.5	71.7	87	75		10.28	1.93	27
August	80.5	84.7	86.0	74.9	80.5	88.3	72.0	84	71		3.79	1.68	12
September	81.5	85.6	86.8	75.6	81.2	89.5	70.1	81	68		4.53	2.42	13
October	82.5	85.4	86.6	76.3	81.5	90.7	73.4	79	69		3.61	1.64	8
November	80.3	83.5	85.0	75.0	80.0	88.2	72.1	84	74		7.92	2.47	20
December	79.6	82.7	84.3	74.9	79.6	85.4	71.0	83	75		5.35	1.07	24
Mean	79.6	83.2	84.5	74.7	79.6	-	-	83	73		93.05	-	217
Extreme	-	-	-	-	-	90.7	70.0	-	-		17.41	3.36	

MINISTRY OF WORKS AND HYDRAULICS
HYDROMETEOROLOGICAL SERVICE
CLIMATOLOGICAL SUMMARY

Station: Botanic Gardens Lat: 6°49'N Long: 58°11'W No: 81001 Year: 1968

Elevation of station above M.S.L. 0' 7"

Anemometer above ground: 2 metres

Computed by: _____

Checked by: _____

Month	Grass Temperature	Earth Temperature						Wind Speed M.P.H.	Sun Shine	Pressure		Evaporation inches
		8 a. m.			2 p. m.					8 a.m.	2 p.m.	
		1 ft.	2 ft.	4 ft.	1 ft.	2 ft.	4 ft.					
January	71.6	83.3	83.4	*N.R.	83.4	83.5	*N.R.	4.5	6.6	1013.6	1011.8	4.98
February	70.4	83.6	83.9	83.9	83.8	83.7	83.9	4.2	7.2	1013.3	1011.9	4.82
March	70.0	84.6	85.2	84.2	84.8	85.2	84.3	4.3	7.3	1014.5	1012.5	6.24
April	71.5	84.9	85.3	*N.R.	85.1	85.3	*N.R.	2.9	5.4	1013.2	1010.9	4.43
May	70.8	85.4	85.8	*N.R.	85.7	85.8	*N.R.	3.3	6.8	1014.4	1012.3	4.87
June	72.1	84.4	84.9	84.6	84.7	84.9	84.6	3.1	5.9	1014.8	1012.7	3.88
July	72.0	85.3	85.4	84.8	85.4	85.5	84.8	2.9	6.8	1015.1	1013.1	4.98
August	70.9	86.4	86.7	85.4	87.0	86.7	85.5	2.9	8.6	1014.2	1012.1	6.01
September	71.0	86.6	87.4	86.2	87.5	87.4	86.3	3.4	7.9	1013.5	1011.0	6.05
October	70.6	86.3	87.3	86.4	87.2	87.2	86.2	3.7	8.4	1012.8	1010.2	6.34
November	70.1	85.7	86.7	86.3	86.2	86.7	86.3	3.3	6.8	1012.7	1009.8	4.47
December	71.6	84.5	85.2	85.1	84.7	85.2	85.1	3.5	7.8	1013.3	1010.7	4.75
Total	-	-	-	-	-	-	-	-	-	-	-	61.77
Mean	71.1	85.1	85.6	*85.2	85.5	85.6	*85.2	3.5	7.1	1013.8	1011.6	5.09
Extreme												

(* Total for 26 days only
(x) Total for 29 days only

* Average for 9 months

* No Record

MINISTRY OF WORKS AND HYDRAULICS
 HYDROMETEOROLOGICAL SERVICE
 CLIMATOLOGICAL SUMMARY

Station: Ebini

Lat: 5°34'N Long: 57°47'W

No: _____

Year: 1968

Elevation of station above M.S.L.: 50 ft.

Computed by: _____

Checked by: _____

Month	Air Temperature							Relative Humidity (%)		Wind Speed	Rainfall		
	8 a.m.	2 p.m.	Mean		Mean	Absolute		8 a.m.	2 p.m.		Total	Max in one day	No. of days
			Max.	Min.		Max.	Min.						
January	74	82	84	70	77	88	68	95	75		10.51	1.72	23
February	73	82	85	68	77	89	65	96	75		3.28	0.88	17
March	75	85	87	67	77	91	65	92	64		2.77	0.58	11
April	76	83	87	72	79	91	68	92	73		9.52	2.26	20
May	77	86	89	70	79	93	67	89	64		8.47	2.22	16
June	76	85	88	71	79	91	70	93	66		15.65	3.00	22
July	77	84	87	72	79	91	70	93	70		15.08	2.24	24
August	77	88	90	72	81	92	69	90	61		7.20	1.98	14
September	78	88	91	72	81	94	71	88	61		1.51	0.42	12
October	79	91	93	72	83	96	71	87	52		1.87	0.94	5
November	78	85	90	72	81	95	70	89	66		8.68	2.71	19
December	76	85	87	71	79	89	67	94	68		3.15	0.56	13
Mean	76	85	88	71	79	-	-	91	66		85.69	-	196
Extreme	-	-	-	-	-	96	65	-	-		15.65	3.00	-

MINISTRY OF WORKS AND HYDRAULICS
HYDROMETEOROLOGICAL SERVICE
CLIMATOLOGICAL SUMMARY

Station: Mazaruni Lat: 6°24'N Long: 59°48'W NO:

Year: 1968

Elevation of station above M.S.L.: 47'

Computed by: _____

Checked by: _____

Month	Air Temperature						Relative Humidity (%)		Wind Speed	Rainfall			
	8 a.m.	2 p.m.	Mean		Mean	Absolute		8 a.m.		2 p.m.	Total	Max. in one day	No. of days
			Max.	Min.		Max.	Min.						
January	74.9	80.9	82.9	68.9	75.9	85.5	65.0	87	78	10.04	1.87	20	
February	74.8	82.7	84.1	69.3	76.7	86.5	66.5	90	69	4.77	1.05	11	
March	75.3	83.3	85.0	69.0	77.0	88.5	64.0	89	67	5.82	1.77	9	
April	77.2	82.7	84.7	71.9	78.3	89.0	65.0	91	77	6.72	2.30	18	
May	77.0	82.6	85.0	71.6	78.3	89.0	68.5	91	75	12.15	1.93	22	
June	77.1	81.7	83.3	71.7	77.5	87.5	67.0	89	80	11.08	1.32	21	
July	75.9	80.5	83.3	71.5	77.4	87.0	70.0	92	82	11.29	2.18	26	
August	77.4	81.9	85.7	70.9	78.3	89.0	65.0	91	78	5.23	0.65	17	
September	77.8	83.7	87.3	69.0	78.1	91.0	67.0	90	73	6.40	1.11	16	
October	79.7	84.8	87.5	68.4	77.9	91.5	66.0	88	73	6.52	1.21	12	
November	77.6	82.0	85.2	68.1	76.7	90.0	64.0	91	79	14.00	1.78	18	
December	77.3	81.7	84.5	69.1	76.8	88.0	66.0	90	80	8.61	1.91	15	
Mean	76.8	82.4	84.9	69.9	77.4	-	-	90	76	102.63	-	205	
Extreme	-	-	-	-	-	91.5	64.0	-	-	14.00	2.30	-	

MINISTRY OF WORKS AND HYDRAULICS
HYDROMETEOROLOGICAL SERVICE
CLIMATOLOGICAL SUMMARY

Station: St. Ignatius Lat: 3°21'N Long: 59° 48' W

No: Year: 1968

Elevation of station above M.S.L.: 355 feet

Computed by: _____

Checked by: _____

Month	Air Temperature							Relative Humidity (%)		Wind Speed	Rainfall		
			Mean		Mean	Absolute					Total	Max. in one day	No. of days
	8 a.m.	2 p.m.	Max.	Min.		Max.	Min.	8 a.m.	2 p.m.				
January	76.9	85.6	88.4	73.6	81.0	91.9	70.8	79	59	1.05	0.31	10	
February	76.9	87.3	89.4	73.5	81.5	92.9	71.0	76	52	.99	0.55	5	
March	77.7	89.8	91.6	74.1	82.9	94.8	71.9	73	45	0.62	0.53	5	
April	77.7	86.6	89.3	74.1	81.7	94.8	70.0	81	60	14.01	8.22	19	
May	76.8	84.9	87.4	73.6	80.5	93.1	70.9	84	64	12.76	2.80	18	
June	76.1	80.9	85.5	72.5	79.0	89.5	69.9	89	76	16.45	2.85	26	
July	75.8	82.6	86.1	72.4	79.3	90.0	70.5	89	71	21.39	3.82	26	
August	79.1	86.0	89.3	74.1	81.7	92.0	71.0	78	63	7.43	1.86	16	
September	80.2	87.5	91.1	74.9	83.0	93.7	70.6	75	57	6.07	2.93	12	
October	81.1	91.2	93.7	75.7	84.7	96.7	73.3	71	47	0.13	0.13	1	
November	80.2	90.0	92.2	76.0	84.1	95.2	72.5	75	51	1.67	0.65	8	
December	78.8	88.1	90.6	74.8	82.7	92.8	72.2	77	54	0.57	0.29	6	
Mean	78.1	86.7	89.5	74.1	81.8	-	-	79	58	83.14	-	152	
Extreme	-	-	-	-	-	96.7	69.9	-	-	21.39	8.22	-	

CLIMATOLOGICAL SUMMARY

Station: Matthews' Ridge Latitude: 6°47'N Longitude: 58°30'W No: _____ Year: 1968

Elevation of station above M.S.L.: _____ Computed by: _____

Height of the thermometers above ground: _____ Height of anemometer above ground: _____

Month	AIR TEMPERATURE									Relative Humidity (%)			Mean Pressure at M.S.L. (mb)	Wind Speed	Cloud Amount	Rainfall (Inches)			
	7 a.m.	Noon	4 p.m.	Mean		Mean	Absolute		7 a.m.	Noon	4 p.m.	Total				Maximum in one day	No. of days		
				Max.	Min.		Max.	Min.											
January	70	80	80	-	87	69	78	93	67	99	78	78	-	-	- - - -	-	6.58	0.87	21
February	69	81	80	-	88	69	79	92	67	99	71	75	-	-	- - - -	-	5.06	1.03	13
March	69	83	82	-	89	69	79	90	67	99	68	68	-	-	- - - -	-	3.62	1.21	13
April	70	83	82	-	89	70	79	91	69	100	73	73	-	-	- - - -	-	7.79	1.51	15
May	72	83	80	-	89	71	80	93	69	99	78	84	-	-	- - - -	-	8.53	1.39	20
June	71	82	77	-	88	71	79	93	69	100	75	88	-	-	- - - -	-	16.80	1.68	26
July	72	81	79	-	88	70	79	90	68	97	78	84	-	-	- - - -	-	11.49	1.59	27
August	74	80	79	-	89	71	80	92	68	94	82	87	-	-	- - - -	-	14.83	2.86	26
September	74	76	76	-	89	71	80	91	70	96	91	91	-	-	- - - -	-	7.27	1.54	19
October	75	78	77	-	90	71	81	92	70	97	90	88	-	-	- - - -	-	6.21	1.05	19
November	.	.	.	.	.	N	O	T		A	V	A	I	L	A B L	E	.	.	.
December	74	76	77	-	89	69	79	90	69	95	91	91	-	-	- - - -	-	6.41	1.10	29
Total	790	883	869	-	975	771	873	-	-	1075	875	907	-	-	- - - -	-	9459	-	228
Mean	72	80	79	-	89	70	79	-	-	98	79	82							
Extreme								93	67									2.86	

Total, Means, Extreme

LAND DEVELOPMENT DIVISIONANNUAL REPORT FOR THE YEAR 1968

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Introduction

The Land Development Division continued to function as a Division of the Ministry of Agriculture and was responsible for the operation of all Land Development Schemes and for the investigation and planning of new schemes for Land Development and Settlement purposes. The Division is also responsible for co-ordinating the services of all Ministries and Departments that are likely to be involved in the planning and execution of Land Development Schemes. Its primary function lies not only in bringing more land under beneficial occupation, but to develop a contented peasantry deriving full occupation and an improved standard of living, thus contributing towards the relief of un-employment and under-employment.

During the year much work was done by the Department in influencing persons who had hitherto worked with the Manganese Mines to take up the lucrative pursuit of Agriculture in the area rather than attempt to find employment in the over-crowded city.

Persons were encouraged to cultivate high priced crops in the area and agreeably with this a team from head office was despatched to the area for the purpose of selecting suitable areas and developing same for agricultural purposes.

Before the cessation of operations by the Manganese Mining Company 640 families who lived in the Matthews' Ridge and Port Kaituma areas were entirely dependent on the company for a livelihood. By the end of 1968, only 158 had left the area, and by that time it was possible to absorb the remainder in some form of gainful activity in the area.

By the end of November 1968, 16 land co-operative societies had been established with a total membership of 230 persons to whom a total area of 15,590 acres were allocated. The groups were given technical advice on the cultivation of corn, cabbages, plantains and other economic crops.

Clearing operations on the agricultural sites and the construction of a roadway linking Pakera to Arakaka and the extension of the airstrip at Matthews' Ridge were effected by the Land Development heavy duty Caterpillar tractors specially ordered for this purpose. There is little doubt that by the end of the year the area was on its way to becoming a thriving farming community the success of which depended on a considerable extent to the invaluable assistance rendered by the Village Affairs Committee.

Very active steps were taken by the Department to collect outstanding rents owing by settlers on the various land development schemes. When warning notices went unheeded, litigation and actual distraint were resorted to. When these measures failed, the Department had no alternative but to eject some settlers who owed substantial amounts of rent. The result of all these activities was that although revenue collection did not come up to expectation, the total collected was still a record. Revenue collection from Garden of Eden was so good that the Ministry of Local Government was able to have the area declared a Local Authority.

Collections from the various schemes were as follows:-

Black Bush Polder	\$367,548.13
Anna Regina	145,180.07
Charity/Amazon	6,635.93
Onverwagt	38,924.94
Cane Grove	48,027.13
Vergenoegen	39,917.47
Garden of Eden	27,385.20

One airstrip was constructed at Black Bush Polder during the year and another area in the rear of Anna Regina measuring 2,400 feet by 800 feet was cleared of heavy trees and levelled and made ready for the construction of an airstrip. Work of a development nature included the constructing of a much needed market at Charity/Amazon. This proved extremely helpful to the residents in the area as consideration is now being given to the extension of the market in the not too distant future.

Much work of land clearing and levelling was done on the various schemes, Black Bush Polder and Anna Regina having given special attention in order to raise productivity in those areas. No less attention was given to township sites, especially at Anna Regina where the Department was able to allocate an additional 300 house lots.

It is anticipated that with better water control and greater attention to water conservation, improved agricultural techniques and better housing on the schemes, the goal will have been attained of a satisfied peasantry on the schemes.

Staff

At 31st December, 1969, the staff of the Division was as follows:-

Chief Land Development Officer	- Mr. J.E. McWatt
Administrator, Black Bush Polder	- Mr. T.I. Douglas
Senior Land Development Officer	- Mr. N.G. Ouckama
Agricultural Engineer	- Mr. A. David (ag.)
Land Development Officers	- Mr. C.A. Persaud Mr. J.R. Browman Mr. J. Brassington Mr. W.O. Barnwell Mr. A. Sattuar Mr. R. Chandra Mr. D. Beaton
5 Assistant Land Development Officers	- Mr. D. Singh (ag.) Mr. L. Haynes (ag.) Mr. Williams (ag.)

During the year Mr. L. Alleyne, Land Development Officer went into retirement.

The administrator and seven Land Development Officers were stationed at the following Schemes:-

Black Bush Polder, Corentyne Berbice	- 31,000 acres (gross)
Mara/Brandwagt/Torani, East Bank, Berbice	22,000 acres (gross)
Onverwagt Land Development Scheme, West Coast Berbice	6,000 acres (gross)
Anna Regina/Tapakuma/Charity/Amazon Essequibo Coast	11,649 acres (gross)
Cane Grove/Vergenoegen/Government Estates	13,000 acres (gross)
Matthews' Ridge/Arakaka/Kaituma Complex Wauna/Yarakita, North West District	34,000 acres (gross)

These officers were responsible for the continued development and administration of the Schemes and for the collection of revenue. The Schemes are provided with the necessary supporting staff - Administrative and Technical.

During the middle of the year, Government decided that immediate plans should be drawn up to permit development of the Matthews' Ridge/ Arakaka/Kaituma area which would form Stage I of the proposed Agricultural, Mineral and Industrial Complex for the North West District in view of the closing down of mining operations by the Manganese Mines Management Ltd.

The Ministry of Agriculture and Natural Resources was chosen as the co-ordinating Ministry for this operation. The Chief Land Development Officer of the Ministry was appointed Project Manager Designate and Land Development Officers of the Division along with Agricultural Officers were assigned special duties in the Region in connection with the take over of the Assets from the Manganese Mines Management Ltd. and phasing in of the Agricultural programme. For the period August/ December, the Chief Land Development Officer operated between the Ministry Head Quarters and the North West District.

ESSEQUIBO LAND DEVELOPMENT SCHEMES
ANNA REGINA, TAPAKUMA, CHARITY/AMAZON

Anna Regina Cum Annexis

The Anna Regina Land Development Scheme is situated on the Essequibo Coast some 12 miles from the Steamer terminus at Adventure and comprises the sections - Reliance, Bush Lot, Anna Regina, Henrietta, Richmond, La Belle Alliance, Lima and the 2nd Depth of Plantation Devonshire Castle. The 3rd depth Lands of these sections have even incorporated into the Tapakuma Project.

The scheme embodies an area of about 7,818 acres gross and it was designed mainly for rice cultivation with portions of the frontlands reserved for residential purposes. There are 800 families numbering about 4,000 persons residing on the scheme, 633 of whom are settlers holding land varying in size from 2 to 10 acres, but in keeping with the recommendations of Mr. F. A. Brown, Land Settlement expert, steps have been taken wherever possible to consolidate holdings to provide plots of not less than 10 acres in size.

Control of the Drainage and Irrigation works in this area has been handed over to the Ministry of Works and Hydraulics. As in the case of the Black Bush Polder Scheme, it is proposed to hand over control of this Scheme to the settlers as soon as the leases have been issued and a Local Authority established. In this connection a Settlers' Advisory Committee has been appointed and is undergoing training in local government practices to undertake this responsibility.

Agriculture

The acreage allocated for agriculture and other purposes are shown at Table I.

Approximate Allocation of Acreage for Agriculture and other Purposes

Estates or Sections	Total acreages of land	Actual acreage under rice - 1967	Acreages reserved for Co-operative pastures	Acreages reserved for farm lands	Housing Areas	Sand Reef Abandoned	Agricultural Station	Airstrip
Reliance	1,002.59	700	-	234.59	68	-	-	-
Bush Lot	589.18	422	-	167.18	-	-	-	-
Cotton Field	62	-	-	-	62	-	-	-
Anna Regina	1,417.96	827	42	446.96	102	-	-	-
Henrietta	507.50	313	180	-	14 $\frac{1}{2}$	-	-	-
Richmond	965	609	320	-	36	-	-	-
La Belle Alliance	1,088	1,061	-	-	15	-	-	-
Lima	1,167	1,053	83	-	32	5	-	-
Devonshire Castle	633	633	-	-	-	-	-	-
Total	7,438.23	5,618	625	848.73	329.50	5	-	-
<u>Tapakuma Area</u>								
Fear Not/McNabb	2,468.151	1,430.151	1,038					
Bounty Hall	260	260	-					
Better Success	360	360	-					
Andrews	340	340	-					
Better Hope	520	520	-					
Maria's Delight	170	170	-					
Total	4,118.151	3,080.151	1,038					
GRAND TOTAL	11,556.381	8,698.151	1,663	848.73	329.50	5	-	-

Comparative Acreages and Yields - 1967 and 1968 - Padi Crops

Sections	Acreages 1967	Acreages 1968	Total Yields in Bags		Average Yields bags per acre	
			1967	1968	1967	1968
Reliance	700	684	9,693	9,344	13.8	13.6
Bush Lot	422	405	6,032	5,552	14.2	13.7
Anna Regina	827	803	13,287	11,760	16	14.6
Henrietta	313	281	5,060	3,712	16.1	13.2
Richmond	609	663	8,942	9,392	14.6	14.2
La Belle Alliance	1,043	1,080	11,738	13,264	11.2	12.3
Lima	1,053	867	10,434	8,528	9.8	9.8
Devonshire Castle	633	597	4,721	7,248	7.5	12.2
	5,600	5,380	69,907	68,800	12.4	12.8
<u>Tapakuma Area</u>						
Fear Not/McNabb	1,430.151	1,124	4,003	6,744	3.5	6
Bounty Hall	260	178	560	1,068	2	6
Better Success	360	220	1,476	1,320	4	6
Andrews	340	152	1,335	912	4	6
Better Hope	520	304	3,508	1,824	7	6
Maria's Delight	170	137	1,403	828	8	6
	3,080.151	2,115	12,285	12,696	3.09	6

On the whole adverse weather conditions affected the entire operation of harvesting and preparation of the land for both the spring and autumn crops. As a result of the inclement weather there was a substantial reduction in the acreage under padi for the Autumn crop and many rice growers especially in the Tapakuma Project suffered reduced yield and complete loss of crop. Self-propelled combines were restricted in their reaping operations largely because of the sodden condition of padi fields. The following acreages were cultivated with padi for the year as compared with 1967.

Table II provides comparative acreages under rice cultivation and yields of padi for the years 1967 and 1968.

With the exception of 114 acres reserved for the Scheme's Junior staff, all the farm lands have been allocated to co-operative Societies and to settlers. The names and acreages are as follows:-

(a) The Wyaka/Mainstay Land Society	-	137 acres
(b) The Red Lock United Land Society	-	310 acres
(c) The Essequibo Productive Pigs and Oils Co-operative Society	-	54 acres
(d) The Oakland Co-operative Group	-	66 acres
(e) The Anna Regina Settlers	-	167 acres

Soil samples were taken of the 114 acres reserved for the Junior Staff in the 3rd depth of Reliance. The results have shown that a fair crop of rice can be grown, but artificial manures would have to be applied.

Dairy Farm and Pastures

The amended leases for the "Reliance/Lima Livestock Rearers Co-operative Society Ltd." are still to be issued to this Society.

During the year 48 acres of the Anna Regina dairy pasture and 87 acres at Lima were fenced by self-help effort.

The Reliance/Lima Livestock Rearers Co-operative Society Ltd. functioned satisfactorily and 485 head of cattle were agisted for the period under review. The Society has applied for a loan to clear the pastures of heavy bush thus providing a larger grazing area for cattle. Agistment fees collected for the period totalled \$984.00.

Layout for housing

In an effort to alleviate the acute housing shortage facing that scheme, 380 house lots were made available for allocation to settlers in the new housing areas of Anna Regina, Reliance, Henrietta/Richmond and La Belle Alliance as follows:-

Reliance East of the Public Road	-	39 house lots
Reliance West of the Public Road	-	44 house lots
Henrietta	-	69 house lots
Richmond - North and South	-	150 house lots
La Belle Alliance - North and South	-	69 house lots
Anna Regina	-	9 house lots

For the year a total of 299 house lots were allocated. The remainder would be allocated early next year.

The Honourable W. O. R. Kendall O. B. E. Minister of Health and Housing launched two aided self-help Housing Projects as follows:-

- (a) On the 31st July the New Reliance Aided Self-Help Housing Project was launched for the construction of 21 houses.
- (b) On 4th December the "Progressive Reliance Aided Self-help Housing Project" was launched for the construction of 25 houses.

Pure Water Supply

Settlers are being encouraged to provide self-help in laying pipe lines and ditching to improve the water supply to a number of houses in both the old and new areas.

Agricultural Machinery

The Scheme's heavy duty Caterpillar Tractors bulldozed, cleared and levelled approximately 18 acres of sand reef land in the La Belle Alliance North Section for the cultivation of rice.

Work for Co-operative Land Societies was carried out as follows:-

- (a) 33 acres cleared and levelled at Queenstown 2nd Depth for the "Queenstown Co-operative Land Society".
- (b) 10 acres of land cleared and levelled at Fear Not 2nd Depth for the "Danielstown Agricultural Producers' Co-operative Land Society".
- (c) 16 acres of land cleared and levelled at Fear Not 2nd Depth for the "Fear Not Co-operative Land Society".
- (d) 10 acres of land cleared and levelled at Hibernia 2nd Depth for the "Hibernia Co-operative Land Society".
- (e) 13 acres of land, cleared and levelled for private individuals.
- (f) 5 acres of land cleared for the Youth Division of the Prime Minister's Office for establishing a camp site, playground and beach head at Mainstay Lake.
- (g) 3 acres of land at St. Denny's Mission, Tapakuma Lake, for the growing of peanuts by the Amerindian Settlers.
- (h) Bulldozing and clearing site for the proposed Anna Regina Airstrip. The area cleared for the air strip measured 2,400 feet by 800 feet and for the air strip approach 400 feet by 800 feet.

The machines were also on hire to the Ministry of Works and Hydraulics for 957 hours for the purpose of heaping loam at "High Point" Tapakuma 338 hours for the Drainage and Irrigation Board for grading dams on the Scheme.

Revenue and Expenditure

The total revenue collected was \$145,180.07 as compared with \$169,237.82 collected last year. This short fall was due mainly to the fact that machinery hire charges for 1967 amounted to \$64,977.15 as compared with \$22,420.26 this year. Also, last year the collection of the Tapakuma Drainage and Irrigation rates amounted to \$20,654.78 as compared with \$6,532.19 collected this year.

It is however worthy of note that the total rice land rental collected for 1968 was \$109,477.48 as compared with \$78,955.28 for 1967 - a substantial increase of \$30,522.20.

A comparative statement of revenue collected for 1967 and 1968 is detailed below:-

	<u>1967</u>	<u>1968</u>
Rice land rent	78,955.28	109,477.48
House lot rent	3,931.08	5,435.61
Pasture rent	20.75	27.41
Business lot rent	493.91	987.76
Provision farm rent	16.25	34.32
Water rates	176.32	144.00
Tapakuma drainage and Irrigation rates	20,654.78	6,532.19
Machinery hire charges	64,977.15	22,420.26
Miscellaneous	12.30	121.04
	<hr style="width: 100%; border: 0.5px solid black;"/>	<hr style="width: 100%; border: 0.5px solid black;"/>
	\$169,237.82	\$ 145,180.07
	<hr style="width: 100%; border: 0.5px solid black;"/>	<hr style="width: 100%; border: 0.5px solid black;"/>

Recurrent expenditure exclusive of Drainage and Irrigation Charges amounted to \$87,530.19. Under Development \$13,759.68 was expended.

Rainfall

The total rainfall recorded at Anna Regina was 89 inches and 07 parts as compared with 63 inches 82 parts for the previous year.

Tapakuma

The Tapakuma Project takes its name from Lake Tapakuma and is based on proposals originally conceived by Mr. F. A. Hutchinson, C.V.E., N.I.C.E., consulting Engineer to the Government of Guyana from 1948-1952. The main purpose was to improve and extend cultivated land by rehabilitating the existing drainage and irrigation system to provide adequate water control for some 35,000 acres, initially, between Zorg-en-Vlygt and Somerset/Berks on the Essequibo Coast.

Approximately 4,100 acres of land were made available for land settlement purposes - 3,100 acres for rice cultivation and 1,000 acres for a pasture. The rice land has been surveyed into 10 acre and 5 acre holdings. 137 Provisional leases have been issued to settlers in the Fear Not/McNabb area. It is proposed to issue outright leases for 25 years with the right of renewal thus security of tenure is assured. The area will then fall under a Local Authority.

Charity/Amazon

The Estates known as Charity and Amazon comprising 170 acres, situated on the right bank of the Pomeroon River were acquired by Government in 1944. The area is considered the vital entre-pot for the Pomeroon River District. It was originally laid out into 35 Agricultural plots, 26 business lots and 11 house lots, most of which are being rented under temporary agreements pending the issue of leases and/or the outright sale of business and house lots.

It is now being laid out as a town ship to serve the Pomeroon River District and the Northern end of the Essequibo Coast. The layout which was prepared by the Central Housing and Planning Authority has recently been modified in accordance with the funds which are being made available for development. The new modified layout caters for 268 house lots, 62 commercial lots, 1 market site, 2 petrol stations sites, 46 light industrial sites, 1 cinema site, 33 reserve sites, 2 parking areas, 1 Church and School site, 1 site for Church, 1 School and playing Field site, 4 public open spaces, 1 acre for Central and Local Government Offices, 1 Cemetery and 45 agricultural plots. On completion of the Scheme, it is expected that the area would be transferred into a progressive community ready to play its part in an Independent Guyana.

Some 115 families now reside at Charity/Amazon as settlers and most of them are engaged in the cultivation of Citrus, Coffee and ground provisions where a ready market is found at Charity. A Settlers' Advisory Committee has been appointed and soon a local authority for this area would be established.

Development and Expansion

A Land Surveyor was engaged in survey work during the latter part of the year and field work was completed around mid-December.

Three new access bridges were put down and 2,263 square rods of bush was cleared at Amazon section to implement the layout of the streets.

During the year the newly constructed market was declared open by the Deputy Prime Minister the Honourable Dr. P. A. Reid. Among those present on this occasion were Mr. F. A. Noel, Permanent Secretary, Ministry of Agriculture and Natural Resources, Mr. D. Ford, Permanent Secretary, Public Service Ministry, Mr. J. E. McWatt, Chief Land Development Officer, and the United Nations Adviser to the Public Service Ministry.

The new market affords accommodation for 4 kitchens and 16 stalls. A new market bridge was constructed during the year.

Dams and Trenches

365 feet of river defence dam was constructed at Amazon and a new sluice door was built and fitted on the Charity River dam sluice.

Rainfall

The total rainfall recorded for the year was 131 inches 49 parts as compared with 83 inches 24 parts for the previous year.

Revenue and Expenditure

Revenue collection for the year amounted to \$6,635.93 as compared with \$3,625.15 for the previous year.

A total recurrent expenditure in the sum of \$14,969.00 was incurred as compared with \$13,992.00 last year.

Under Capital Expenditure \$7,591.47 was spent.

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BLACK BUSH POLDER LAND DEVELOPMENT SCHEME

The Black Bush Polder Scheme is situated on the Corentyne Coast some 100 miles from Georgetown between the Berbice and Corentyne Rivers and lying to the rear of the frontlands from Whim to No. 50 Village.

The Scheme comprises of an area of approximately 31,000 acres gross most of which is used for the cultivation of rice. It is divided into four sections, namely:- Lesbeholden, Mibikuri, Joanna and Yakusari and provides for the settlement of 1,441 families. 1,201 families occupying rice plots of approximately 15 acres each plus a 2½ acre homestead for a house and the cultivation of garden crops, the rearing of poultry and a number of dairy cattle. 240 families occupying farm plots of 7½ acres each on which permanent and food crops are grown plus a 2½ acre homestead for occupation as outlined above. The homestead plots are sited in the centre of each section and are grouped around the areas set aside for community services (Community Zones). The lands are drained by gravity with the assistance of three large drainage sluices placed at convenient points across the Public Road on the frontlands of Lesbeholden, Mibikuri and Yakusari. Irrigation is effected by pumping water from the Canje River by the use of three 45 inch diameter vertical spindle axial flow pumps into a seven mile long Canal which conveys the water into a net work of channels to the rice cultivation areas.

The following table shows the distribution of holdings in the Polder controlled by the Land Development Division

TABLE III

Section	Nature of Holdings		
	Homesteads	Rice	Farmstead
Lesbeholden	244	243	-
Mibikuri	515	388	103
Joanna	312	234	67
Yakusari	378	336	70
	1,449	1,201	240

The method of tenure is by leasehold for a period of 25 years with a right of renewal for a further period of 25 years thus security of tenure is assured. To date 638 leases have been issued. Preparation of the remaining leases are receiving attention and should be completed and delivered to the settlers in 1969.

The following table provides a breakdown of the utilization of the area controlled by the Land Development Division:-

TABLE IV

Rice cultivation	17,830.167	Acres held by settlers
Rice cultivation	411.000	Acres held by Agriculture
Homesteads	3,310.966	Acres
Farmland cultivation	1,799.720	Acres
Community Zones	151.910	Acres
Rice Mill Sites	37.590	Acres
Pure Line Seed Padi Bond	16.180	Acres
Combine Shed Site	12.440	Acres
Agricultural demonstration Station	9.696	Acres
Burial ground Sites	30.250	Acres
Area reserved for Airstrip	58.320	Acres
Drainage and Irrigation Works	3,331.565	Acres

Agriculture

The 1968 spring crop yielded 164,740 bags of padi from 17,839 acres. Due to adverse weather conditions the Autumn crop only yielded 126,115 bags of padi from 15,797 acres.

Table V shows comparative figures for the past two years.

Homestead Areas

The position at the end of the year was as follows:-

Sections	No. of Houses erected at end of 1967	No. of Houses erected 1968	Total No. of Houses at end of 1968
Lesbeholden	241	3	244
Mibikuri	481	41	522
Joanna	226	5	231
Yakusari	324	1	325
Total	1,272	50	1,322

The level of production of kitchen garden and vegetable crops in the homestead areas was generally good. However, settlers in the Mibikuri North and South Sections suffered loss of crops in the homestead due to the year end rains and the silted outfall channel at Mibikuri.

Production figures are shown at Table VI.

Pure Water Supply

There has been no further development in the installation of the purification plant and the sinking of a number of deep Artesian Wells at Mibikuri. It is hoped that this would be completed next year.

Community Zones

As explained previously, community zones are established in each of the four sections. In each zone provision is made for a school and playground, community centre and grounds, market, churches, teachers' houses, filling stations, government officers' quarters and commercial purposes. At Mibikuri Community Zone sites have also been reserved for Cottage Hospital, Secondary School, Commercial Banks, Post Office and Central Police Station.

Preferential rights to lease the following sites at Mibikuri have already been sold:- one Cinema, one filling station, one workshop and one grocery and also one grocery site at Yakusari Community Zone.

The two groceries - one each at Mibikuri and Yakusari have already been erected.

Clearing of New Lands

Some 192 acres of new land at Mibikuri north and south and Yakusari north and south for the cultivation of crops other than rice were cleared during the year. This area when cultivated would boost the production of food crops, vegetables and fruit.

Airstrip

An airstrip 1,700 feet by 50 feet has been constructed at Mibikuri north. 2½ miles of roadway from the Inter-settlement road to the airstrip has been surfaced with burnt earth.

Work on the airstrip terminal building was nearing completion at the end of the year.

TABLE VIHOMESTEAD PRODUCTION 1968

Items	Lesbeholden lbs.	Mibikuri lbs.	Joanna lbs.	Yakusari lbs.	Total lbs.
Bananas	46,500	33,240	34,200	27,600	141,540
Papaws	57,500	36,170	5,200	7,850	106,720
Corn	-	400	200	165	765
Plantains	9,600	29,050	8,100	6,080	52,830
Cassava	39,500	28,580	3,150	3,625	74,855
Cabbages	1,050	7,585	600	14,350	23,585
Tomatoes	23,600	3,580	9,890	3,507	40,577
Black-eye peas	-	2,795	700	3,325	6,820
Melons	3,700	4,420	3,900	1,625	13,645
Leaf Crops	4,675	3,305	250	2,400	10,630
Boulangers	27,000	26,102	10,470	12,825	76,397
Vine Crops	18,500	16,520	3,170	4,690	42,880
Peppers	1,475	5,640	350	3,456	10,921
Eschallots	800	1,490	150	2,667	5,107
Pumpkins	1,550	4,525	3,050	525	9,650
				Total	616,922

	1967				1968			
	<u>SPRING CROP</u>		<u>AUTUMN CROP</u>		<u>SPRING CROP</u>		<u>AUTUMN CROP</u>	
	Acreage Cultivated	Paddy Reaped	Acreage Cultivated	Paddy Reaped	Acreage Cultivated	Paddy Reaped	Acreage Cultivated	Paddy Reaped
<u>Settlers Holdings</u>								
Rice Lands	17,351	171,719	17,451	106,654	17,839	164,740	151,797	126,115
Farmlands	391	2,932	505	1,513	909	5,841	696	2,777
<u>Agriculture Division:-</u>								
Pure Line Seed Padi	-	-	110	1,057	-	-	75	718
TOTAL	17,742	174,551	18,066	109,224	18,748	170,581	152,568	129,610

Revenue

Revenue collected for the year amounted to \$367,923.32 as compared with \$355,566.08 collected last year an increase of \$12,357.24. This increase was due primarily to the continued serving of writs of endorsement for the recovery of rents.

Table VII provides in detail the revenue collected for the year.

Conclusion

The Black Bush Polder Scheme commenced settlement in 1960 and by 1961 settlement was nearly completed, hence it could be said that the scheme was in operation for about eight years. It is felt that the settlers should now take over the Administration of the scheme and in this connection Government has taken a decision to hand over the scheme to a Local Authority. A Settlers' Advisory Committee has been set up and members are already receiving training in Local Government practices by specially trained officers from the District Administration Office in Berbice. It is hoped to commence the removal of the Administrative staff from the Polder as soon as the final lease has been issued and the Local Authority established. A skeleton staff would however be retained in the area to collect outstanding rents and to act as liaison between the Ministries of Local Government and Agriculture.

ONVERWAGT LAND DEVELOPMENT SCHEME

Onverwagt Land Development Scheme is situated on the West Coast of Berbice, approximately 55 miles from Georgetown. It extends on the North from the public road to the Abary River on the South, and is bounded on the West inland, 1,711 rods, by Trafalgar, thereafter by Tempie, Britannia, Yeoville, Ross and Brahan, and on the East inland, 1,711 rods, by Lovely Lass, thereafter by Bush Lot.

This area, formerly known as Plantation Onverwagt (No. 27), comprising about 6,000 acres of land, acquired by the Rice Development Company under agreement for expansion under direct mechanised cultivation, was handed over to Government by the Board of Directors of that company in March, 1955. Since then the administration of Plantation Onverwagt has been under the control of Government and is recognised as the Onverwagt Land Development Scheme.

On July 28th, 1955, the Legislative Council approved of an expenditure of \$10,000.00 for the preparation and fencing of the estate in advance of a proposed Land Development Scheme. The department then proceeded to prepare plans for the improvement of the drainage and irrigation of the scheme and for full utilization of the cultivable land; but these plans have not yet been approved.

In the meantime small improvements have been carried out year after year on the estate. The existing trenches were reconditioned and new ones dug; the empoldered dams were built up and fenced; a concrete sluice was constructed at the seaward side of the scheme to effect better drainage; and in order to facilitate easy entry into the scheme a main driving dam has been constructed, which it is hoped, would be completely metalled in the next year or two.

In 1956 an area of 1,200 acres was set aside for the agistment of cattle, but farmers did not make use of this facility and eventually in 1958 the pasture was abandoned and the land allocated to farmers for the cultivation of rice. One of the reasons given for not using the pasture was that no drinking water was available for the cattle in the dry weather and in the wet season there was inundation.

VIII - TABLE VIIREVENUE COLLECTED 1968

1.	Rice Lands, Farmlands and Homestead Rent	.....	\$360,996.45
2.	Land Rent Workshop Site	.....	240.00
3.	Pounds	.....	5,766.09
4.	Application Fees	.....	365.00
5.	Water Rates	.....	42.00
6.	Workshop Repairs	.....	22.25
7.	Supply of Electricity Current	.....	111.00
8.	Cost of Writs	.....	318.83
9.	Auction Sale	.....	5.15
10.	Surplus of Revenue	.....	.19
11.	Refund of Wage	.....	7.56
12.	Refund of Sale	.....	48.80
			<hr/>
			\$367,923.32
			<hr/>

The land is mainly suitable for the cultivation of rice. It is pegassy clay. However there is a small reef of 30 acres of coconut cultivation south of the railway line, and a fish culture station occupies a tract of 112 acres north of the public road to the sea dam.

Provision has also been made for the establishment of a residential area, and 126 acres have been reserved for this purpose. But in 1966 about 26 acres of this acreage have been transferred to the Guyana Electricity Corporation for the putting down of a power plant in connection with the rural electrification scheme. The plant was put into operation on 1st February, 1967.

Allocation of land on an annual basis commenced in 1955 and in that year 1,716 acres were allocated to 154 tenants. To date, 5,196 acres have been allocated, and there are 422 farmers. Cultivation of the land was on a risk basis as drainage and irrigation of the area was not guaranteed.

Rice Cultivation

Due to adverse weather conditions the Autumn Crop only yielded 23,712 bags of padi from 3,638 acres cultivated as compared with 27,824 bags harvested last year from 4,154 acres.

Revenue and Expenditure

Revenue collected for the year amounted to \$38,924.06 as compared with \$31,693.70 collected in 1967.

Expenditure amounted to \$33,983.02 as compared with \$35,885.00 expended last year.

Conclusion

A settlers Advisory Committee has been appointed, and it is proposed that as soon as the legal aspects with the Estate have been cleared and leases issued, a local authority will be established to permit the settlers handling their own affairs.

WAUNA/YARAKITA LAND DEVELOPMENT SCHEME NORTH WEST DISTRICT

The Wauna Pilot Project, North West District, embraces approximately 1,500 acres out of some 34,000 acres reserved for agricultural settlement and consisting mainly of low sandy hills and some lateritic formations capping a range of hills to the south. The vast area is separated from an established farming community and administrative centre in the Mabaruma/Hosororo hills to the north by a vast stretch of pegasse swamp some 2½ miles wide over which has been built an access road between the years 1961-1965. To the south the area extends to Yarakita and is intersected by a network of perennial streams and heavy forest. Apart from a few Amerindians who occupy small plots in scattered villages bordering the main creek, the area is virtually un-inhabited.

The Project was planned as a Pilot Project to settle 50 progressive families for the cultivation of citrus, coffee, food crops, and the rearing of beef cattle. The need for this project was realised when many farmers in the North West who were cultivating the flat lands on the banks of the rivers complained that in a few years their crops, particularly those of a permanent nature, were yielding poor returns and the lands were continually in danger of flooding.

Development work commenced during 1962 after the completion of the necessary survey plans. Over the period 1962/64 a layout for homesteads and other residential purposes was established. A layout for a community zone has also been established. A well has been sunk in the area and an overhead tank with pump has also been erected. One mile of pipe line has been laid with 6 stand pipes at convenient points. Four staff houses were constructed, a workshop for repairs to machinery, a store-room a fuel bond and a two-apartment building to house two of the open vote employees.

Forty-nine (49) persons were selected for land in 1964, but at the end of 1968 after re-allocating a number of surrendered or abandoned plots only forty-two (42) settlers were in occupation. Of this number eight (8) are still not permanently residing on their plots. The Project qualified for food-aid through the United Nations World Food Programme in 1964, and has continued to receive such assistance.

Under the Supervision of an Agronomist from the Food and Agriculture Organization, an Agricultural Demonstration/Experimental plot has been established with coconuts, citrus, cocoa, ground nuts, pears, peas, ground provisions, pineapples and grasses and already important information has been gathered which will greatly assist the development of long term farming on these soils. Nevertheless, the project suffered set-backs from the lack of sustained technical assistance and failure to provide necessary credit for obtaining foundation stock of beef cattle.

Progress 1968:

Agriculture

There has been no change in the allocation of holdings, as shown in the table hereunder:-

<u>Size of Holding</u>	<u>House Lot</u>	<u>Resident</u>	<u>Non Resident</u>	<u>Total</u>
15 acres	9	9	1	10
25 acres	21	21	4	25
50 acres	Nil	4	3	7

The 30 house lots occupied are in cultivation with permanent and garden crops. Rearing of poultry is being actively pursued by settlers.

Some 162 acres of forest were cleared by settlers during the year for which Government paid a grant of \$30.00 per acre. A free distribution of the following plants was made to 25 settlers during the National tree planting week:- 750 cocoa, 274 lime, 1,576 orange, 436 grapefruit, 23 black-pepper, 400 Robusta coffee, 628 coconuts and the following plants were purchased by nine settlers:- 127 pears and 684 coconuts.

There has been an increase of 74 acres of permanent crops over the previous year and this is reflected in detail in the table below:-

<u>Type of Crop</u>	<u>End of 1967</u>	<u>End of 1968</u>	<u>Increase</u>
Citrus	47 acres	52½ acres	5½ acres
Coconuts	122 "	161 "	39 "
Coffee	76 "	98 "	21½ "
Cocoa	10 "	10 "	-
Avocado Pears	9 "	19½ "	10 "
	<u>264 "</u>	<u>340 "</u>	<u>74 "</u>

Most of the area under permanent crops was under planted with cash crops. A list of the principal crops harvested and sold during the year, after deduction for home use, is given hereunder:-

Ground provision	-	56,722 lbs.
Bitter cassava	-	46,126 "
Plantain	-	7,946 "
Bananas	-	3,649 "
Green Vegetable	-	6,029 "
Tomatoes	-	398 "
Peppers	-	985 "
Corn	-	4,291 "

In addition fair quantities of pork, poultry meat and eggs were produced.

Machinery and Equipment

The D6 Caterpillar Tractor was on hire to the District Administration for grading and widening streets, clearing and preparing a site for the Government Secondary School and a public park at Mabaruma.

Work on the construction of the Hosororo/Aruka Independence road project continued with the use of two Bedford trucks, one 10 RB Dragline, one cement mixer and one D6 Caterpillar tractor.

One D6 Caterpillar tractor and certain workshop facilities were transferred to Matthews' Ridge and maintenance of the remaining machinery and equipment at Wauna was provided by the Workshop staff at the Ridge.

The air-strip at Mabaruma on Mr. B. Khan's estate was being constructed with the use of the other D6 Caterpillar tractor, two Bedford trucks and one Traxcavator on hire for the purpose.

Roads and Bridges

Minor repairs were effected to sections of the road system and construction of one new bridge was commenced.

Pure Water Supply

The scheme continued to be serviced with pure water from draw off points in the housing area. Well water is pumped to an overhead tank and fed to the draw off points by gravity.

Agricultural Demonstration Plot

The Agricultural demonstration plot was maintained by the Agricultural department for research and extension purposes.

World Food Programme

The scheme continued to benefit from food-aid to the settlers.

Staff

At the end of the year the staff situation was as follows:-

Mr. D. E. Beaton	-	Land Development Officer
Mr. P. Dyall	-	Assistant Clerk
Mr. L. Timothy	-	Storekeeper
Mr. F. Verwayne	-	Chauffeur/Mechanic

A reduction of staff became necessary towards the end of the year and it was seen fit to have the Land Development Officer in charge stationed at Port Kaituma with periodical visits to Wauna.

MARA LAND DEVELOPMENT SCHEME

The Development of Plantation Mara cum annexis comprising about 3,800 acres on the East Bank of the Berbice River commenced during the year 1957. This settlement is situated about 25 miles from New Amsterdam at the end of the road and comprises the estates Mara, Germania, Vryberg, Schepmoed, L'Enterprise and Ma Retraite.

The lands were allocated to 84 selectees for the cultivation of rice on the basis of 15 acres each with accompanying homesteads of 2½ acres each following the pattern of the Black Bush Polder Scheme. 46 selectees were also allocated farmsteads of 15 acres each for permanent crops.

Due to poor irrigation, poor soil fertility and continuous loss of crop through blast disease and also to a large degree, bad husbandry by the settlers there was a decline in agricultural production and in the social aspect of the scheme from the year 1958. At the end of 1968 only 32 settlers - 26 rice and 6 farmland settlers - remained, the other having given up occupation of the land.

On re-examination of the scheme, it has been decided that Mara cum annexis should be used by the agricultural division of this Ministry as a cattle breeding station and plans towards this are now in train.

The Ma Retraite Co-operative Scheme which once comprised 51 members has also shown a terrible decline over the years and steps are being taken to have the Society liquidated. There are still however 18 persons on the scheme who are working mainly on their 2 acre homestead plots.

Cultivation

During the year some 40 acres were cultivated by the Agricultural Division in black-eye peas at L'Enterprise section. The crop bore well, but at the end of year harvesting had not been carried out.

Land Clearing Equipment

Two D-6 Caterpillar tractors were loaned to Black Bush Polder Scheme for clearing forests - some 192 acres were cleared. The Black Bush Polder scheme also used the machines for bulldozing and levelling lands at Mibikuri for establishing an airstrip and some 2 miles of roadway leading to the strip.

The machines were also used at Brandwagt/Sari to clear lines for the excavation of Drainage and Irrigation works.

Rainfall

Rainfall recorded for the year totalled 65 inches 44 parts as compared with 81 inches 63 parts last year.

Revenue and Expenditure

Revenue collected for the year totalled \$2,290.44 as compared with \$1,684.00 collected last year.

Recurrent expenditure amounted to \$89,642.75 as compared with \$88,397.00 spent last year. This amount was spent in maintaining the scheme - drainage works, dams, roads etc. in fair condition. A large amount - about 40% - was also spent on the repairs and maintenance of the machines.

Brandwagt/Sari Land Development Scheme

The scheme comprising approximately 11,000 acres gross and situated about 6 miles south of the Mara Land Development Scheme was approved in 1964 for the settlement of 500 families, to be operated on a co-operative basis phased over a 3 year period. The crops recommended were in keeping with proposals approved for the development of the scheme; 150 persons were selected in June, 1964. Later in that year, the co-operative society was registered with a complement of 68 paid up members. The crops recommended by the Chief Agricultural Officer were bananas, pine-apples, citrus and grasses.

In the meantime a topographical survey of the area was completed and the Land Development Division commenced clearing for the layout of the homestead and community zone area following an approved plan prepared by the Town and Country Planning Authorities. Surveys and designs for the drainage and irrigation works were also completed.

In 1965 a decision was taken to modify the Brandwagt/Sari Schemes to take the form of a pilot co-operative as first stage development of the area. The pilot co-operative now caters for 50 families who would occupy a 2 acre homestead each along with 400 acres for permanent crops and the rearing of cattle. This Project comes under the Land Development Officer at Mara. A supervisor, however has been appointed by Government to manage the affairs of the society until such time as the society is in a position to appoint its own Manager. This supervisor resides in the area.

Over the period 1964/66, staff houses were constructed for use of the officers involved in the promotion of the Project. A temporary school was also established and pure water made available. An access road between Mara/Brandwagt was constructed and partly surfaced. The necessary internal roads were also constructed as a means of ingress and egress to the area. A number of homestead plots were cleared and a 21 acre block within the main cultivation area was cleared for the establishment of a pasture. A provisional lease was issued to the Society. Minor drainage and irrigation works were undertaken by the Land Development Division pending major works to be undertaken by the Drainage and Irrigation authorities. The scheme qualified for food aid from the United Nations World Food Programme in 1964. This programme however came to an end in June, 1967.

Progress 1968

There was considerable loss of crop due to flooding of homestead plots early in January. It was found necessary to provide some form of assistance to the settlers by way of preparing their homesteads to a point where they could have them re-cultivated and each settler was also provided with a loan of \$300.00. One settler received \$125.00.

At the commencement of the year there were 13 settlers. During the year 11 settlers were admitted to the society, but 15 settlers vacated leaving only 9 settlers at the end of the year.

Clearing Lands

Clearing of new homesteads commenced during the year and 11 acres were cleared before the machines were removed to Black Bush Polder.

Drainage and Irrigation

During the latter part of the year work was re-commenced by the Ministry of Works and Hydraulics on the empoldering of some 1,000 acres. A 38-B dragline from the Ministry of Works and Hydraulics was placed on excavation of the ABC irrigation Canal while Mara Land Development RB 10 dragline was placed on subsidiary drain 2/VI. It is anticipated that the empolder would be completed early next year.

A new check sluice was constructed in collector drain VI in the vicinity of subsidiary drain 6/VI to regulate the flow of water and to prevent any further flooding of the homestead areas.

A new drainage outlet sluice with 6 feet x 5 feet bore greenheart box was constructed to replace a smaller one in collector drain VI.

Mara/Brandwagt Roadway

The roadway linking Mara with Brandwagt/Sari was re-metalled during the year.

Expenditure

Expenditure for the year was \$34,930.00.

CANE GROVE/GARDEN OF EDEN, GOVERNMENT ESTATES AND
VERGENOEGEN

Schemes Cane Grove and Garden of Eden situated on the East Coast and East Bank, Demerara. Government Estates (Windsor Forest, La Jalousie and Hague) on the West Coast, Demerara, and Vergenoegen on the East Bank, Essequibo, which were developed and administered by the Land Development Division are no longer under the administrative control of the Division. On a decision taken by Government in 1960, the Land Development Division was requested to relinquish administrative control of these schemes. The Ministry of Works and Hydraulics then took over the control of the Drainage and Irrigation Works, while the agricultural extension services continued to be provided by this Ministry. Pending the establishment of proper administrative control, through local authorities, the collection of rents is still being undertaken by this Ministry. Action in this direction has been stepped up during the year.

Draft leases have now been finalised, and it is hoped that in the course of 1969, the tenants of Cane Grove and Vergenoegen would be issued with titles to the lands allocated to them.

The Cane Grove Scheme, an abandoned Sugar Estate, was designed to provide housing and cultivation plots for rice and ground provision with pasturage for cattle. Certain toxic soils allocated for rice, and other areas for farmlands have not been cultivated for several years, because of very poor yields. Write off for a substantial sum of arrears will have to be sought and an early decision taken on the future utilization of the land.

During the year an occupation survey of the tenants holding plots was done as a preliminary to the issue of titles. All rent registers were brought up-to-date, and notices were served on tenants for the recovery of outstanding rents.

The original layout of Garden of Eden provided for 77 homesteads for the cultivation of permanent crops and the rearing of dairy herds, with limited market gardening. Within the last four years, however, due to several reasons there has been a rapid conversion of most holdings with consequent destruction of much permanent cultivation to the cultivation of sugar cane with financial assistance from the Demerara Company Ltd.

The roads have suffered from the heavy traffic during the harvesting of the sugar cane, but recently a system of canals are being put down to permit easy transport to the factory by water-way.

During the year, the scheme was declared a Local Authority, under the Local Government Ordinance, Chapter 150, and the settlers as a whole are beginning to show a greater sense of responsibility in the management of the area.

Legal proceedings for the recovery of outstanding revenue were taken against settlers.

In the case of Government Estates these settlers were long in possession of leases - 99 - year leases in the first instance and where succession could not have been proved 21 year leases and later 25 year leases were issued.

The layout provides for housing, rice cultivation with limited farm lands and communal dairy byres and pastures. A portion of the savannah pasture in the rear of Windsor Forest has been leased for cultivation of sugar cane, and it would seem desirable to convert the remaining portion of sugar cane as few cows are now agisted in that pasture. It is also contemplated to issue one lease to a Co-operative to manage the Communal dairy byre and pasture at Windsor Forest.

The Ministry of Local Government is to set up a working local authority for the area.

At Vergenoegen, the layout provides for housing, cultivation of rice and ground provision and some dairy farming. During the year, an area of about 75 acres, formerly reserved for dairy farming, was leased to the Perseverance Co-operative Land Society for agricultural purposes.

The Settlers' Advisory Committee, which should serve as liaison between the Government and the tenants has not been very active.

Titles, it is hoped, would be ready for issue during 1969 to those farmers allocated lands and this might stimulate enthusiasm in the local authority when formed.

Revenue collected on the schemes listed above is shown below:-

CANE GROVE
Revenue Collected during 1968

Rice Land Rent	\$ 35,818.28
Farm Land Rent	3,637.67
House Lot Rent	2,022.36
Communal Byre Rent	3,049.26
Fodder Plot Rent	20.00
Agistment Fees	1,038.28
Instalment Rural Housing Loan	967.85
Interest on Rural Housing Loan	662.25
Application Fees	5.00
Court fees and Crown costs	406.18
Deposits for work for Private Party	400.00
	<u>\$ 48,027.13</u>

GARDEN OF EDEN
Revenue Collected during 1968

Revenue	1967	1968
Rents	47,100.57	27,016.00

GOVERNMENT ESTATES
Revenue Collected during 1968

	1967	1968
Agistment Fees -	2,590.54	3,534.36
Communal Byre Rents -	385.40	383.43
	<u>\$ 2,975.94</u>	<u>\$ 3,917.79</u>

VERGENOEGENRevenue Collected during 1968

Rice, Farm and House	\$ 38,905,56
Dairy Farm	27.00
Communal Byre	525.18
Rural Housing Loan	321.45
Interest on R. H. Loan	138.28
	<u>\$ 39,917.47</u>

WORLD FOOD PROGRAMME

The agreement between the Government and the World Food Programme entered into on 13th March, 1964 was extended to June 30th, 1969, to enable settlers of the Wauna Pilot Project and the Kumaka/Kwebanna Amerindian Settlement of the North West District to continue to benefit from food-aid supplied by the Programme.

Food-aid to these schemes is a form of assistance to the farmers during the initial clearing of the land and establishment of permanent crops to the time when reasonable returns could be expected.

An average of 116 families (comprising 700 adults and 1,080 children) were involved on both schemes during the year, and the table below shows the quantity of food received from the Programme and issued to the settlers:-

Food Items	Received	Issued
Wheat Flour	38.74 tons	44.91 tons
D. W. Milk	4.48 "	4.72 "
D.S. Milk	2.75 "	3.78 "
Cheese	2.58 "	2.83 "
Dried Fish	2.50 "	2.37 "
Canned Fish	6.93 "	5.59 "
Canned Meat	7.20 "	5.86 "
Butter	4.18 "	5.05 "

Two United Nations officials (Dr. Brunori and Mr. de Alth) were on an appraisal visit to the Schemes in July. In October, Mr. J. Nielsen arrived in the country as Project Officer and was taken on a familiarisation tour to the two Schemes.

Four quarterly reports were prepared and submitted to the United Nations Local Representative for transmission to Rome.

SUMMARYREVENUE AND EXPENDITURE

Revenue:- Rents, etc. collected on the various Land Development Schemes amounted to \$686,711.00 as compared with \$658,906.00 collected last year.

Expenditure:- Similarly recurrent expenditure on all land development schemes totalled \$673,767.00 as compared with \$584,705.00 spent for the previous year.

A comparative statement with respect to the above is shown at Table VIII.

TABLE VIII

Schemes	Revenue Rent etc.			Recurrent Expenditure	
	1966	1967	1968	1967	1968
Black Bush Polder Land Development Scheme	\$303,293	\$355,566	\$367,923.32	\$176,599	\$210,992.80
Mara Land Development Scheme	9,931	1,684	2,290.44	88,397	89,642.75
Onverwagt Land Development Scheme	22,933	31,693	38,924.06	35,885	33,983.02
Cane Grove Land Development Scheme	28,044	23,230	48,027.13	30,880	113,304.29
Garden of Eden Land Development Scheme	2,567	47,100	27,016.00	8,860	7,669.70
Government Estates West Coast Demerara	3,106	2,976	3,917.79	20,326	18,614.39
Vergenoegen Land Development Scheme	12,919	20,750	39,917.47	49,193	43,652.03
Anna Regina/Tapakuma Land Development Scheme	107,160	169,238	145,180.07	160,573	140,939.44
Charity/Amazon Land Development Scheme	5,418	3,625	6,635.93	13,992	14,969.00
Wauna/Yarakita Land Development Scheme	74	3,044	6,878.82	-	-
	\$495,445	\$658,906	\$686,711.03	\$584,705	\$673,767.42

DEVELOPMENT EXPENDITURE

Development Expenditure incurred during the year was \$110,277.00 (un-reconciled) as against \$272,678.00 spent the previous year. Table IX shows in the amount expended in respect of each scheme.

TABLE IX

Project	Development Expenditure	
	1967	1968
Black Bush Polder Land Development Scheme	\$ 19,522	\$ 11,425.71
Mara Land Development Scheme	-	-
Brandwagt/Sari Land Development Scheme	25,563	34,930.66
Anna Regina/Tapakuma Land Development Scheme	36,959	13,759.68
Charity/Amazon Land Development Scheme	35,260	7,591.47
Wauna/Yarakita Land Development Scheme	110,482	33,022.54
Machinery and Equipment	10,000	-
Preliminary Investigations	4,000	-
World Food Programme	30,892	9,546.72
Total	\$272,678.00	\$110,276.78

ARREARS REVENUE

The total cumulative arrears of Revenue i.e. rent etc. at the end of the year was \$2,226,658.00 as compared with \$2,340,516.00 at the end of the previous year. The figure in respect of Wauna/Yarakita was not available.

Table X shows arrears outstanding in respect of each Settlement Scheme.

TABLE X

Schemes	Cumulative Arrears of Revenue, Rents etc.	
	as at 31.12.67	as at 31.13.68
Black Bush Polder Land Development Scheme	\$ 1,302,410	\$ 1,328,000.00
Mara Land Development Scheme	135,064	136,606.85
Onverwagt Land Development Scheme	104,339	90,797.57
Cane Grove Land Development Scheme	301,712	280,140.38
Garden of Eden Land Development Scheme	45,614	34,490.71
Government Estates West Coast Demerara	2,770	1,474.42
Vergenoegen Land Development Scheme	184,988	184,933.51
Anna Regina/Tapakuma Land Development Scheme	256,481	162,681.41
Charity/Amazon Land Development Scheme	7,069	7,533.91
Wauna/Yarakita Land Development Scheme	69	X
	\$ 2,340,516	\$ 2,226,658.76

RECOVERY OF ARREARS REVENUE

Steps taken by the Ministry during the year under review to effect recovery of arrears revenue outstanding on Land Development Schemes is shown at Table XI.

TABLE XI

Schemes	No. of Specially Endorsed Writs prepared and sent to Crown Solicitor			No. of Writs of Execution prepared and sent to Crown Solicitor	
	1966	1967	1968	Supreme Court 1968	Magistrate Court 1968
Black Bush Polder	-	684	509	665	-
Mara	25	-	-	-	-
Onverwagt	182	2	101	-	-
Cane Grove	516	-	-	-	-
Garden of Eden	-	57	33	-	-
Government Estates					
West Coast Demerara	-	-	-	-	-
Vergenoegen	457	-	154	-	-
Anna Regina	247	-	120	-	-
Tapakuma	-	-	-	-	-
Charity/Amazon	48	-	-	-	-
Wauna/Yarakita	-	-	-	-	-
Total	1,475	743	917	665	-

RAINFALL

Annual precipitation figures for the Schemes are listed below for the current and previous year.

Land Development Scheme	1967		1968	
	Inches	Parts	Inches	Parts
Black Bush Polder:-				
Lesbeholden	47	57	70	29
Mibikuri	47	28	65	91
Joanna	75	60	66	24
Yakusari	80	43	78	70
Mara	81	65	65	44
Onverwagt	86	98	83	04
Cane Grove	85	42	X	
Garden of Eden	129	43	101	82
Government Estates, West Coast Demerara:-				
Windsor Forest	113	98	99	06
Vergenoegen	132	82	107	52
Anna Regina	63	82	89	07
Charity/Amazon	83	24	131	49
Wauna	122	67	100	71

X Figures not available.

Staff List at 31st December, 1968Head Office

B.W. Carter, MSc., D.E.C.F.I., D.I.C.T.A	Chief Agricultural Officer (Ag.)
E. Payne, B.Sc., M.Sc.,	Agricultural Officer
W.A. Bovell	Supervisor of Credit
<u>Economics Division</u>	
Nityanand, B.Sc., Dip. Agric. Econ.	Senior Economist (on leave)
P.R. Arjoon B.A. (Hons.) Econ., M.A. Econ.	Senior Economist (ag.)
Balwant Singh	Statistical Officer
Osman Ali	Technical Assistant
Inserdut Seeraj	Technical Assistant
<u>Botanic Gardens</u>	
I.C. Agard, D.E.C.F.I.	Agricultural Officer (ag.) Curator (ag.)
<u>Apiary Division</u>	
P.A. Allicock	Bee Keeping Officer
<u>Information Division</u>	
Miss E. Grant B.Sc.,	Agricultural Assistant (Information)
<u>Cane Farming Division</u>	
C.A. Bannister, Dip. Agric.	Cane Farming Officer
<u>Veterinary and Animal Husbandry Services</u>	
F.E. Mongul, D.V.M., M.R.C.V.S., D.T.V.M.	Principal Veterinary Officer.
R.N.D. Raja, B.Sc., B.V.Sc., A.H.	Veterinary Officer (Essequibo)
P.L. McKenzie, D.V.M.	Veterinary Officer (Georgetown)
G.B. Smart, D.V.M.	Veterinary Officer (Berbice)
A.B. Watkins, D.V.M.	Veterinary Officer (Central Agricultural Station)
H.O. Sadberry, D.V.M.	Veterinary Officer (Georgetown)
E. Lietz, Ph.D.	Animal Husbandry Adviser (West German Government)
S.P. Legg, M.C., B.Sc., M.A.	Livestock Research Officer (Ebini)
C. Shaw, D.E.C.F.I.	Swine Production Officer
D. Jaigoo	Farm Manager (ag.) (Central Agricultural Station)
L. Sawers, D.E.C.F.I.	Farm Manager (North West District)
Miss C. Blackman	Laboratory Technician

L. Sancho	Laboratory Assistant
R. Tiwari	Laboratory Technician
G. Ramsarran	Laboratory Assistant (Georgetown)
K. Bovell	Anti-Rabies Technician
S. Mohabir	Dairy Inspector
M. Assad	Dairy Inspector
C. Menzies	Artificial Inseminator (Central Agricultural Station)
T. Paul	Artificial Inseminator (Central Agricultural Station)
G. Rasul	Artificial Inseminator (East Coast Demerara)
E. Ramdat	Artificial Inseminator (East Bank Demerara)
P. Ramdeen	Artificial Inseminator (Léguan)
T. Maraj	Artificial Inseminator (Essequibo Coast)
D. Singh	Artificial Inseminator (West Demerara)
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T. Arthur	Laboratory Assistant
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V. Khan, Cert. Guyana School of Agriculture	Laboratory Assistant

Research Division

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A.L. Agard	Agricultural Officer (Central Agricultural Station)
V.E.A. Chin, B.Sc.	Agricultural Officer (Rice)
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K. Croal	Technical Assistant (Entomology)
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M.V. Ram Rao, B.Sc., M.Sc.,	Chemist
L.E. Massay	Technical Assistant (Chemistry)
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J. Bassier, B.Sc.	Soil and Water Conservation Officer
P. Scott, B.Sc.,	Agricultural Engineer
P.O. Jackson	Agricultural Assistant (Perennial Crops)
B.B. Trotman	Agricultural Assistant (Central Agricultural Station)
A.V. Downer, B.Sc., M.Sc.	On Leave
R. Fletcher, B.Sc.	On leave
D. Jawahir, Dip. Guyana School of Agriculture	On leave
C.E.M. Goring	On leave.

Field and Extension Division

M. Ramnaraine, Dip. Agriculture Principal Agricultural Officer
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Berbice District

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Nehoralall, D.E.C.F.I.	Agricultural Field Assistant
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D. Winsor, B.Sc. (CUSO)	Agricultural Assistant

Rupununi

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H. G. Marvelle	Field Assistant (Fisheries)
F. G. Forte	Field Assistant (Fish Culture)