Joint symposium on maize and peanut. Held in Suriname
on behalf of the 75th Anniversary of
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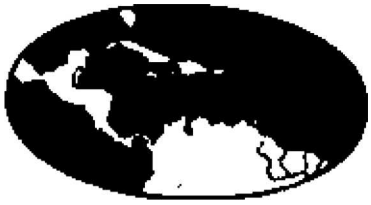

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MAIZE CULTIVATION IN SURINAME

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SUMMARY

This paper provides background information on maize cultivation, area and production in Suriname. Data on area and production of maize since 1945 and export and import figures are presented.

History

It is not known when maize was introduced in Suriname. It is believed that it was grown before the Africans and Indians immigrated to Suriname. Amerindians were believed to cultivate corn even before the eighteenth century and it was presumably originated in Central America. In Suriname, it is the second important grain crop after rice.

Location

Suriname is situated between 2^{o} and 6^{o} North latitude and 54^{o} and 58^{o} West longitude on the Northeastern coast of South America. It borders on the Atlantic Ocean to the North, on Guyana to the West, on French Guiana to the east and on Brazil to the South. Its size is 160,000 square kilometers with a total of about 400,000 inhabitants.

Ecological conditions of maize growing areas.

Climate

Rainfall in the coastal area (elevation, 10 to 30 meters) is erratic in distribution. The annual precipitation ranges from 2,000 mm to 2,500 mm. There are two rainy seasons, one long season from May to September (± 1,200 mm) and the short rainy season from November to February (± 900 mm). Annual mean temperature is around 27^{o} C and the mean day temperature is $30,9^{o}$c with insignificant differences between the months. The relative humidity is high throughout the year (70 to 80%) with maximum humidity (86%) in June. Daylength varies from 11 h 46 – 12 h 28.

The average percentage of sunshine hours at Paramaribo are:

J	F	M	A	M	J	J	A	S	O	N	D
42	49	45	42	31	45	57	68	72	71	61	43

Soils

The soils on the coastal regions vary from medium to high fertile soils, from sandy loams and loamy sands to clay and clay loams. In the Demerara formation two main landscapes can be distinguished.

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a. the young sea clay landscape, covering 14,600 sq. km
b. the ridge landscape, covering 1,300 sq. km. The young sea clay landscape has a flat topography and consists of very heavy textured soils (clay 60-70%) with strong swelling and shrinkage capacities. The material originates from the Amazon estuary and was transported by the sea current. Under natural conditions the clay landscape is characterized by the occurrence of swamps. The dominating soil colors become more pronounced. The pH (H_2O) of clay soils varies from 4.5 to 5.5 and the organic matter average percentage is 3.0. The ridge landscape consists of long, by the rivers sedimented sand bodies separated by more or less parallel swamps filled with heavier material. Generally it can be stated that the chemical level of the sandy ridges is low. The pH (H_2O) of sandy loam varies from 5.3 to 6.0 and the organic matter percentage from 1.0 to 2.5. A detailed description of soils of Suriname is given by van Amson (1966).
In Zandery formation, the soils (sand, sandy loam and loamy sand) are drought succeptible, acid and low in organic matter and other nutrients.

Farm size

Maize is usually grown on small areas as a backyard crop mostly on less than a hectare (400 to 2,000 m^2). On large farms which are very few in number (2 to 5 hectares), the farmers grow maize under good management with standard cultural practices, though not mechanized.

Cultural Practices

In humid tropics there has been a traditional cultural pattern related to corn production. Virgin areas of bush are cut and burnt towards the end of the dry season preceding the rainy season in which corn is planted. The burning destroys tons of green organic material which would be impossible to integrate with the soil. The ash residue from the burnt material contributes to calcium, potassium, phosphate and other mineral content of the soil. This system which is traditionally used in South and Central America and Africa is still being used in Suriname by 20% of the farmers who grow maize. Maize is commonly planted after a fallow, in shifting cultivation, in relay and intercropping patterns.

Other previous crops besides maize include legumes, mostly peanut, soya, and cowpea, Amsoi, cassava or even fruit crops. Maize is planted after the first rains in May or June and November or December.

A survey recently conducted in two major maize growing areas, districts Saramacca and Commewijne, revealed that the maize growing is still primitive and the average findings of the cultural practices are briefly described below.

Plantmaterial

Almost all the farmers buy the seeds either from the local market or from the neighbour without having any knowledge of the variety, maturity or yield of that particular cultivar. Floury flints are commonly grown. There are no authorized seed companies or such organizations where the farmers can easily buy the seeds in large quantities.

Ploughing

No ploughing is usually practiced except weeding and slightly moving the soil with simple implements. 50% of the growers prepared seed beds (3 to 10 metres wide) especially on clay soils with poor drainage. No beds are needed on the well-drained soils of the interior.

Planting

Farmers use planting distances according to their conveniences. The plant populations vary from 10,000 to 25,000 plants per hectare. Mostly one seed per hole is planted and no replanting is done except in cases of poor germination and such other problems. Planting is done by machete (or drill stick).

Weed control

Weeding is usually done by hand using simple implements such as a cutlass. Two to five percent of the farmers use preemergence or postemergence herbicides. Handweeding is done once or twice during the growth period and the first weeding is done within four weeks after planting and the second one in seventh or eighth week.

Fertilizers

None of the farmers who were part of our survey used any fertilizer. Probably because of the fallow land used to obtain a first crop. Only on large farms, chemical fertilizers such as urea, double super phosphate and sulphate of potash are in use, for corn growing.

Insect pests

None of the small holders take notice of the minor infestation rate of *Laphygma frugiperda* which is the major pest in corn growing in Suriname. Dipterex or Sevin is used against this insect on large farms (1 to 5 hectares).

Harvesting

Very small percentage pick green ears and mostly the ears are left to dry on the plant. The green maize are sold for human consumption and the dried corn mainly as chicken feed or as grown maize for human consumption. Harvesting is done entirely by hand when the leaves turn brown and the cobs are dry.

Threshing is also done by hand and sun drying of the cobs is a common practice. Forty percent of the farmers treat the seeds before storing and the same seeds are used for next season sowing again. The crops which are planted after maize include legumes, maize and vegetable crops such as amsoi and cucumber.

Yield

Grain yields are very low ranging from 750 kg to 2,000 kg per hectare on individual farms. The average falls around 1,500 kg. This is due to the primitive method of cultivation and lack of attention given to the crop.

Few farmers who grow maize on 2 to 5 hectare reported 4 to 5 tons of grain yield per hectare under good management.

These farmers are interested in mechanization which would be ideal in Suriname as there is always a labour shortage. However, on the young coastal plain-soils the introduction of machines can be hampered by the bed-system. Maize remained as a second important crop to rice for a long time because the farmers were never encouraged or educated on maize growing. Without machines, the maize cultivation, area and production would remain the same as the farmers have to consider labor shortages and high labor costs which would lessen their profit margins.

Evidence suggests that maize has been growing in Suriname since many decades. Though small quantities of grain were produced, it was exported to the neighbouring countries, mostly to Guyanas between since 1930's and 1961. Maize was first imported in 1950 to Suriname and the imports gradually increased from 12 tons in 1950 to 14,000 tons in 1975 at a price of about Sf 280 per ton. Maize was exported at a price ranging from Sf 160 to Sf.200.In 1976, over 3 million guilders were spent on corn imports mainly utilized in the animal feed mills.

In 1945, 996 hectares were used for corn growing, mostly in the district of Saramacca, Commewijne, Nickerie and Suriname. The area of production was gradually decreased until 1958 when it was 1,024 hectares with the maximum production of 1,851 tons. The area and production had gone down to 96 hectares and 132 tons in 1976. Area and production values are plotted in figure 1, while import and export data are presented in table 1. (Corn was grown mostly as a catch crop after clearing. In the past clearing was traditionaly done by hand and corn was planted before putting the land into permanent use. Today most of the land is cleared by machines and little attention is given to grow a catch crop which is presumably one of the reasons for a drop in area and production of maize in recent year.)

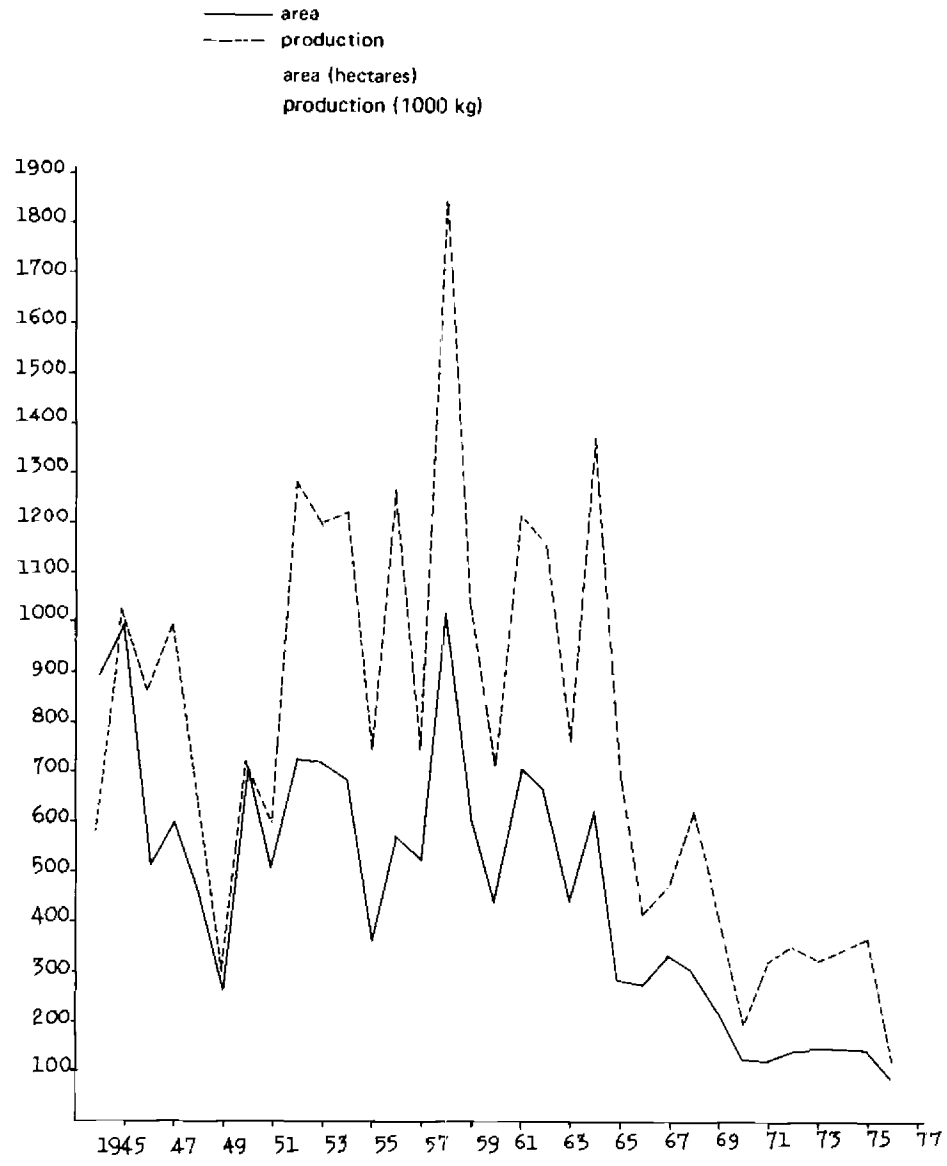

Fig. 1 — Area and Production of Maize in Suriname

Table 1 Exports and Imports of maize

Year	Export (1000 kg)	Value (1000 sf)	Import (1000 kg)	Value (100 Sf)
1945	37	8	–	–
1946	228	36	–	–
1947	222	40	–	–
1948	176	35	–	–
1949	–	–	–	–
1950	–	–	25.426	4.987
1951	3	–	82	10
1952	16	4	92	23
1953	–	–	68	12
1954	–	–	10	2
1955	–	–	–	–
1956	2	1	–	–
1957	1	0	138	48
1958	–	–	101	33
1959	–	–	135	45
1960	16	4	154	57
1961	84	26	70	37
1962	–	–	90	50
1963	–	–	76	32
1964	–	–	139	49
1965	4	1	125	44
1966	–	–	3.847	611
1967	–	–	4.848	824
1968	–	–	1.915	1.369

Source: Suriname Trade book

Table 1 (continued): Imports and Exports of maize

Year	Imports (MT)	Value (100 $ U.S.)
1970	10.093	650
1971	10.196	690
1972	7.200	490
1973	12.300	1.460
1974	10.015	1.287
1975	17.349	1.919
1976	22.099	2.459
1977		

source: FAO Trade book 1975 and 1976

Uses

Corn has its origin in Central America and has been a basic food in the nutrition of Aztec, Incas and other civilizations of the Americas. In Suriname maize is used by Amerindians, creoles, bush-negroes and others in preparing an oat meal substitute milk for babies, or as roasted green corn, or boiled medium ripe corn. The creoles make excellent corn puddings and cakes which

are of a nourishing quality when eaten with young pods of okra, or althaea plant (J.G. Stedman 1796.) Most of the dry kernels of maize is used for non-ruminant animals. Other products such as corn oil, corn starch and corn flakes are widely in use, but are imported from the U.S.A.

Research on Maize

The Agricultural Experiment Station is the only center for maize agronomic research, while the Center of Agricultural research creates some facilities for research work in the tropics.

At the experiment station trials were started as early as 1917 with Suriname cultivars some of which were originated from Java and Near East. Varietal trials with American hybrids started in 1964. Weed control experiments were initiated in the seventies. *Laphygma (Spodoptera) frugiperda* and *Heliothis zea,* the important insect pests are under study. The first cost analysis experiment was conducted at Tijgerkreek-West in 1977 and the price per kilogram of corn grains was calculated to be around 28 cents after considering the cost of chemical fertilizers, herbicides, insecticides and labor input. First international Elite Variety trial (ELVT) was carried out in co-operation with CIMMYT (maize and wheat improvement center-Mexico). This ELVT – 18 included 14 short statured, open pollinated white and yellow cultivars and two local varieties. Elites were found to be promising with high yields (up to 6 tons per hectare) compared to local varieties which produce a maximum yield of 5 tons per hectare under favourable conditions. Elite trial was also carried out in the interior (Zanderij formation) at Coebiti where the soils are poor and drought susceptible and the yields were depressed by almost 50% compared to those at Tijgerkreek-West. Few promising elites will be planted on large areas to confirm their stability for production before releasing to the farmers.

CONCLUSION

Maize cultivation in Suriname is still primitive, though it is grown since many decades. Extensive production was never ensured or encouraged perhaps due to the non-surinamese interests of the erstwhile rulers of the country. The result is that the country is not self sufficient in corn and have been importing corn since many years spending approximately 3 millions of guilders on maize imports annually. The imported grain is mostly used for animal feed. Maize grows well under Suriname conditions with abundant rainfall and sunshine hours. There is a good possibility that this country could become self-sufficient in corn providing that interest is stimulated among the farmers by for example a price guarantee.
It was calculated that 500 hectares should be adequate to meet local production demand of corn.

It will be a long term project as the farmers are not too enthusiastic to grow this grain crop on large scale due to the labor shortage in Suriname. Also inexpensive machine types should be imported to stimulate maize growing in Suriname. It is certainly an economically important crop as indicated by the import value. It requires sincere efforts of research extension service workers and others to educate the farmers in this so important crop for Suriname.

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