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**PROCEEDINGS
OF THE
CARIBBEAN FOOD CROPS SOCIETY**



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MECHANIZED PRODUCTION OF GRAIN AND LEGUME CROPS
IN TRINIDAD AND TOBAGO

A Report on the Work of the Chaguaramas
Agricultural Development Project

Lawrence Cross

A lot has been written and said about the need for and importance of crop diversification in the Caribbean countries. This of course, depends on finding crops which will give reasonable returns and are adapted to perform well under local conditions. The amount of attention which this Society has paid to maize in the past (3) has resulted in the increased importance which agriculturists and governments of the region have attached to maize production. Many of us hope that this new interest may lead to the establishment of a viable maize industry in the Caribbean area.

All the reports published on the feasibility of maize growing in the Caribbean have made favourable predictions about the economic prospects of large-scale production of the crop in the area. In Trinidad and Tobago, in particular, a series of studies carried out at the Texaco Food Crop Demonstration Farm and reported in the Farm bulletin (1) have led to the conclusion that "maize for grain cannot be profitably grown unless a high degree of mechanization is practiced on a reasonable large acreage. For maximum returns, yields per acre must be maintained over the 3,500 lbs. level and cost must be reduced to a minimum, i.e. below \$ 150.00 per acre. This leaves \$ 100.00 net profit per acre which should be a reasonable return on the investment required."

Another crop which is used widely in the production of animal feeds is soya beans. Over four million dollars was spent on the importation of soya bean meal and cake into Trinidad and Tobago in 1970.

R. W. Radley (4) carried out a series of investigations into the prospects for producing soya beans in Trinidad and Tobago. Apart from the screening and selection of varieties that could form the basis for the initial production of the crop, he also investigated the agronomic features that would influence yield. He concluded that soya beans could usefully be placed in a rotation with maize and may be expected to give yields which equal or exceed average yields obtained in the U.S. Further work, however, needs to be done in selecting more suitable varieties and techniques for the growing of the crop. The next logical step indicated by our studies on maize and soya beans would be the establishment of a moderately large scale commercial farm to examine the economics of scale which may be associated with a high level of mechanized production. It was not by chance, therefore, that in 1970 the Government of Trinidad and Tobago proposed to the Government of the Federal Republic of West Germany that a joint project be set up to produce maize and soya beans on a large-scale mechanized commercial farm.

The Chaguaramas Agricultural Development Project is situated in the Tucker Valley of the Western peninsula. Its purpose is to bring under cultivation six hundred (600) acres in three years. The main crops to be grown are maize, sorghum and soya beans. The farm began operating in January 1971.

To ensure maximum returns from the commercial farm, a small seed production and research unit was set up as part of the overall project. The seed unit should select or develop the most suitable varieties or hybrids to be grown on the commercial farm. In addition, it is entrusted with the task of producing and supplying the farming community with certified seed of selected vegetable crops.

Williams & Spence (5) have shown the possibility of producing pigeon peas in the mechanized system. Pigeon peas planted as a row crop in October or November at close spacings develop to a height of 2 - 4 ft. This allows for mechanized spraying of the crop during flowering to reduce the incidence of insect infestation. When a high percentage of the pods have dried on the plant, the crop is reaped by combine with very negligible losses. It is expected that large acreages of pigeon peas can be produced in this way for seed or dry peas.

In its' first year of operation, the Chaguaramas Agricultural Development Project has been able to prepare from virgin forest over 300 acres. On an experimental area, within twelve months, three crops have been reaped from the same field; one crop of maize and two crops of soya beans. It is, however, still too early to determine the combination of crops which will best fit into a satisfactory rotation.

On the commercial farm a serious problem associated with the production of soya beans was loss in the field when harvesting was done by combine. Our experience to date suggest that:

a) The crop cannot be grown on cambered beds (normally used in Trinidad to facilitate drainage) since the ground is uneven and not amenable to combine harvesting.

- b) The crop plants must bear the pods high enough for the complete crop to be harvested by the combine. In our trials pods were borne too low down with the result that the combine decapitated plants leaving 10 - 15% of the pods in the field. The unevenness of the ground also contributed to this loss. It is also necessary on virgin land to use hand labour at planting to remove all stone, stumps and pieces of metal which could get into the combine at harvest and damage the machinery or at least cause delays.
- c) The variety used should be non shattering. This allows a less critical determination of the time of harvesting and a greater percentage recovery of pods; immature harvesting can result in a high percentage of loss due to crushing of the green pods in the drum of the combine.

Soya bean processing is another subject which has to be given careful consideration. Dr. R. Dimler (2) emphasized that "in considering new processing, such as of soya bean, in countries like those of East Africa, one must take a realistic approach. The methods and the types of products found in the United States can be used as goals but there should be no expectation of starting out at such levels. Instead, one must start with simple, low cost operations that will give a useful product."

In recent times and in connection with the field production of soya beans contemplated at the Chaguaramas Agricultural Development Project, it has become necessary to decide what type of bean processing is feasible both in the short and long term. The combined pressure and solvent method is costly and can only be supported by large-scale production. On the other hand pressure techniques give lower oil extraction percentages and a very oily meal. Some problems arise also in degumming and purifying the oil.

It is important to note, however, that "the most recent development in soya bean feeding in the United States itself is a revival of interest in feeding full-fact soya beans to animals and poultry (2). This interest has been brought on by an unusual combination of the relatively low price the farmer receives for the soya bean and the relatively high price he has to pay for the defatted soya bean meal."

The Chaguaramas Agricultural Development Project with the co-operation of the Caribbean Industrial Research Institute (Cariri) is still actively considering a cheap and simple method of processing the small quantities of soya grown on the Project but at the same time it is intended to produce a good quality meal and highly refined oil.

There is a reasonable expectation that mechanized production of grain and legume crops in the region will be economically successful. The Chaguaramas Agricultural Development Project is still in the early stages of development and many questions remain to be answered. I am convinced that our increasing demand for more protein and oil sources and our urgent need to reduce our foreign exchange spending can be helped considerably by this programme.

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