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**Proceedings of the Fourth Symposium of the  
International Society for Tropical Root Crops**

**Held at CIAT, Cali, Colombia, 1-7 August 1976**

**Edited by James Cock, Reginald MacIntyre, and Michael Graham**



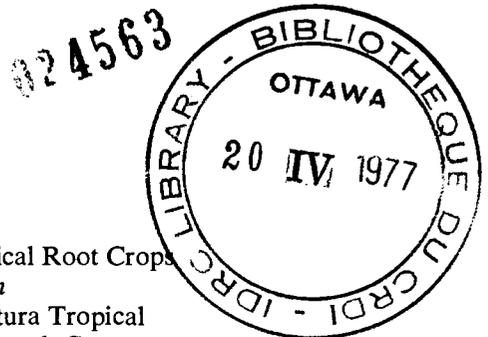
**The International Society for Tropical Root Crops in collaboration with  
Centro Internacional de Agricultura Tropical  
International Development Research Centre  
United States Agency for International Development**

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**PROCEEDINGS**  
of the  
**FOURTH SYMPOSIUM**  
of the  
**INTERNATIONAL SOCIETY**  
**FOR TROPICAL ROOT CROPS**

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## The Importance of Cassava Processing in the Economy of Colombia

Hugo Valdes Sanchez<sup>1</sup>

A large number of countries, including Colombia, can never hope to be self-sufficient in certain cereals such as wheat, and thus it is vital to expand production of other crops that are known to grow well. Cassava flour is an adequate substitute for wheat flour. Thus, as an investment against a future world shortage of wheat, the production of cassava should be expanded in order to ensure an adequate quantity of raw material to support processing industries.

In terms of volume, the most important crops that are being produced on a world wide basis are: wheat, rice, potatoes, maize, barley, millets-sorghum, sugar, and cassava. Unlike some of these crops, cassava is easy to grow, is not affected by disease to any great extent, and gives comparatively large yields. Because of the importance of this crop in the economies of the developing countries, a great deal of research has been undertaken with a view to improving the yield and utilization of this crop both as a fresh and processed product.

Cassava is an important crop in the economy of Colombia. The national yields from 1970 to 1975 have averaged 8-9.3 t/ha. These yields are low, and considering that some areas in Colombia yield 25-30 t/ha, it is clear that certain areas are producing at a level considerably lower than the national average.

During the past few years, investigations have been carried out to find a partial substitution for wheat by processing flour from such products as cassava, rice, and maize. This has met with some degree of success. Partial substitution of wheat flour by 10% cassava flour has been achieved in Brazil and this has been readily accepted by the market. This has resulted in a considerable saving in foreign exchange by reducing the quantity of wheat that

must be imported.

As substantial quantities of wheat are imported into Colombia, the question of establishing an industry for the production of flour from alternative crops is a matter that should be given a high degree of priority, both from the point of view of saving foreign exchange and as an investment against a future world food crisis.

If the future level of imports of wheat into Colombia is taken at 400 000 t/year with a flour extraction factor of 75%, the volume of flour would amount to 300 000 t. If 10% cassava flour was used only 270 000 t of imported flour would be required, which in terms of imported wheat would amount to 360 000 t, which represents a reduction of 40 000 t. The average cost of wheat imports in 1975 was at the rate of US\$ 153.40/t. Current prices are well in excess of US\$ 200/t with a possibility that they will increase still further. A reduction of 40 000 t in imports based on a price of US\$ 200/t would save foreign exchange to the extent of US\$ 8 million, which at the present rate of exchange (US\$ 1 = 34.545 Colombian pesos) would amount to over C\$ 276 million.

### Necessity to Increase Production

A world food crisis emerged in 1972 when production of cereals declined by over 30 million tons. This occurred at a time when an increase of some 25 million tons was needed to meet the requirements of an expanding world

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population. This crisis was more serious in the developing countries than in the developed countries due to a higher population growth in the former.

The effect of this crisis was that less food could be given as aid to the developing countries, and a rapid increase in world prices of cereals to levels that many countries could not afford. Although prices subsequently declined to more realistic levels, they would again show an upward trend if there were to be a crop failure, or even a partial crop failure, in any one of the major producing areas in the world. There is evidence that this could possibly occur in the near future.

It is vital for countries such as Colombia to make the utmost utilization of their own supplies of basic food crops, to make available as much food as possible to feed an expanding population, and to reduce the quantities of imported food, particularly as prices of cereals are again showing an upward tendency.

The population in Colombia has increased from 21.1 million in 1970 to 24.5 million in 1975.

The present increase is at the rate of 2.9% per annum and if this is maintained the population will double by the end of this century.

### **FAO/UNDP Mission to Colombia**

At the request of the Government of Colombia, a FAO/UNDP mission visited Colombia in 1967 to define a suitable pilot project for the production, processing, and utilization of composite flour made from locally produced raw materials. A technical and economic survey was undertaken on cassava and the mission's report included the following main recommendations:

(1) The Government should initiate a study on the feasibility of producing baked products made from locally produced raw materials, the testing of these products, and the determination of their acceptance to the public.

(2) Based upon the results of this study, a detailed cost-structure analysis should be made. The Government should redefine its policies on cassava and soya production and processing, and commercial bakeries should be provided with sufficient quantities of composite flours of standard quality characteristics at a price competitive with wheat flour.

A feasibility study was duly undertaken and a detailed cost-structure analysis was made.

This revealed that the production of flour from cassava could be an economical operation.

### **Market Factors**

Fresh cassava is a staple item of diet in Colombia, and normally the highest price would be obtained for the fresh product in the urban markets. The nearer the production areas are to the main centres of consumption, the less likely they would be to have a processing industry that could be supplied with an adequate and regular supply of raw material at reasonable prices. A farmer's idea of price is the highest price he has ever received for a specific product in the past. However, it is possible to convince farmers of the financial advantages of selling substantial quantities of produce for processing at prices lower than those to which they have been accustomed, particularly if advice and assistance can be given to enable them to obtain greater yields from the same area of land.

There is always an element of risk in ensuring that processing industries can be made economically viable, and this particularly applies when the raw material is highly perishable as is the case with cassava. One of the risks, and perhaps the main one, is to ensure that there will be adequate supplies of raw material to keep a plant in full production.

However, particularly with highly perishable crops, farmers are sometimes reluctant to increase their production unless they know that there will be an assured market outlet at economic prices for the entire quantity harvested. Therefore, plans for introducing processing industries may not be put into effect due to the unavailability of an adequate supply of raw material. Consequently, if these factors are accepted, no progress can be made in either direction. It is considered that if a small model plant was established in one of the main cassava producing areas it would have the effect of increasing production to a level that would support a processing industry in addition to supplying market requirements for the fresh product. If the economic viability of such a pilot plant could be clearly demonstrated, others would be quick to respond and further plants might well be established in other areas.

### **Pilot Plant**

Plans have now reached an advanced stage for the installation of a pilot plant in Quindio

for the purpose of processing cassava. The capital cost (Colombian pesos) of this plant is: land 50 000; buildings 660 000; local equipment 1 318 600; imported equipment 1 100 000; labour costs 350 000; and cost of installation 300 000. The cost of this project (3 778 600 pesos) is being financed as follows: Comité de Cafeteros del Quindío 10%; Federacafé-Prodesarrollo 10%; Productos Ramo 4%; and Agricultores del Quindío 76%.

The plant will be capable of processing 10 t of cassava in an 8 h working day and this will produce 3060 kg of flour and 340 kg of starch. It will employ 14 people of which four will be responsible for general administration and 10 for processing operations. As well, it will provide indirect employment for a further 40 people. It will be situated in the Armenia area, which is a main centre for cassava production, and where yields are the highest in the country at 25–30 t/ha. This compares with a national average in 1975 of 9.3 t/ha.

On the basis of 200 operating days per annum this would amount to about 600 t of flour. It is intended that this should be a pilot plant. When the results of its operation are assessed, consideration can be given as to whether further plants of a similar capacity should be installed. To produce 30 000 t of cassava flour annually would require a total of 50 similar plants, each of which would save approximately US\$ 120 000 annually in foreign exchange based on a price of US\$ 200/t for wheat. This would provide direct employment for 700 people and indirect employment for a further 2000.

Alternatively, with a view to reducing the number of plants required, consideration could be given to working two shifts of 8 h

each per day. This possibility will be given consideration when the pilot plant is in production. This would reduce the amount of capital required in installing new plants, but it would be necessary to take into consideration the higher costs of wages for persons working unsocial hours.

The pilot plant or plants could be expanded at the appropriate time if this were justified by an increase in production of the raw material. At a later stage consideration could also be given to processing other products such as cassava chips, pellets, meal, etc.

Experiments have already been undertaken on the production of frozen cassava. This was successful as the product was of a high quality with a good appearance. It was readily accepted by the supermarkets in Bogota, and requests have been received for further supplies.

### **Benefits of Cassava Processing Industries**

The benefits to be obtained from establishing cassava processing industries are considerable and are summarized as follows: (1) farmers would be encouraged to expand production of cassava as they would have an assured market at stable prices; (2) Colombia would be less dependent upon imports of wheat with a consequential saving in foreign exchange; (3) it would be an investment against a world food shortage such as occurred in 1972; and (4) work would be created in areas where there is a high rate of unemployment, and thus it would assist in decreasing the flow of workers from the agricultural areas into the large cities.

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## **A Profile of Thai Cassava Production Practices**

**Truman P. Phillips<sup>1</sup>**

This paper presents some preliminary results of an agro-economic survey of Thai cassava producers. The study is part of a larger international network of studies completed or underway in Colombia, Nigeria, and Brazil. All studies have as a common theme the analysis of the economic and agronomic relationships related to cassava production. However, owing to country differences, specific objectives are specified for each study. The objectives of this part of the Thai survey are: (1) the prediction of total cassava production and acreage in Thailand for 1974 and 1975; (2) the identification of major sets of produc-

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