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THE CEREAL GRAIN INDUSTRY IN TRINIDAD AND TOBAGO:

Scope and Programmes for Expansion

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Section 1: Structure of the Cereal/Grain Industry in Trinidad and Tobago

Production Structure

In our discussion of the cereal/grain industry we have included soyabeans because of the close link both in policy and in respect of farming practices between the grain, corn, and the legume soyabeans. Our definition of the cereal/grain industry therefore covers wheat, rice, corn and soyabeans.

Of these products, corn and soyabeans are utilised principally as inputs in the livestock feed industry, while wheat and rice are used for human consumption.

The industry is largely dependent on imports for domestic supplies. All domestic supplies of wheat and soyabeans are imported whilst domestic production of corn accounts for less than 6 per cent of supplies. In the case of rice approximately 70 per cent of domestic demand is met by imports with local production accounting for the other 30 per cent (Appendix Table 1).

Domestic production of both corn and rice is concentrated on small farms at a relatively subsistence level with most of the domestic output being produced on farms of less than 10 acres. The Agricultural Census, 1963 reports that in the case of rice, farms of this size group account for 66.3 per cent of local production and cover 72 per cent of the area under rice cultivation. The corresponding figure for corn shows that 75.7 per cent of green corn production and 73.9 per cent of shelled dry corn production come from farms of this size group which account for 55.6 per cent of the total acreage under corn (Appendix Table 2).

The Land Capability Study, Phase II, undertaken during the period 1970-1972 shows no significant change in this pattern of production. Thus the existing domestic cereal/grain industry is a small, undeveloped subsistence level industry with a predominantly small farm structure.

Marketing and Pricing Policies

Because of the predominantly import oriented nature of the industry marketing is highly centralised. All grain (corn and wheat) and soyabeans are imported from the U.S.A. and Canada. Imports of corn and soyabeans are

handled by the Trinidad Grain Terminals Limited, and by the Flour Mill in the case of wheat. The flour mill processes the wheat into flour which it then distributes to wholesalers all over the territory.

In respect of rice, imports are largely from Guyana and are controlled by the Ministry of Industry and Commerce who provide quotas to a variety of importers/wholesalers who then distribute to other wholesalers and retailers.

Rice and flour have since 1974 been sold at controlled prices under the supervision of Government. Not only are the prices controlled, but for these two items they are subsidised. With the introduction of control prices for imported rice, Government within recent times has also subjected that very small portion of local rice production which reaches the market to price controls.

In the corn/soyabean trade however, prices are not controlled and the Grain Terminals act as import and handling agents for several feed millers in the country.

The Grain Terminals contract with feed millers to bid for grains at the Chicago Grain Terminals at current spot prices and require a 3-month notice of needs and a bid from the millers to close the contract. At the limit, if no bid is made, the price that applies is the spot price on the day of loading at the U.S. port. Prices are dependent on the skill of the local millers at reading the situation on the Chicago market, and require a shrewd decision on the movement of spot prices by the millers, while the Grain Terminals' principals in Canada purchase corn, soyabeans and presumably wheat on the forward markets.

This system of marketing and pricing leaves grain prices highly susceptible to changes in the commodities' market and local millers are wont to adjust their prices accordingly. There is therefore little stability in livestock feed prices and they are subjected to very large increases at times.

Demand

The demand for corn and soyabeans is largely for the livestock feed industry while wheat and rice are for domestic consumption. It is difficult to project demand for livestock feed because of the flexibility that exists in terms of mixes that could be utilized to provide the same nutrients to livestock.

For rice and wheat, however, the Agricultural Development Bank (ADB) has projected demand to 1978 at three levels of utilization, based on nutritional requirements. These levels are (a) current, (b) minimum levels suggested for balanced diets, and (c) desired levels of consumption. These levels of demand indicate that between 1974 and 1978 demand for rice and wheat will increase from 21 million pounds in 1974 to 129 million pounds by 1978 (Appendix Table 3).

Government's Policy

Government's policy towards the cereal industry in Trinidad and Tobago has, until recently, been confined to limited attempts at the promotion

of rice and corn production. Within recent times, based principally on the active promotion of the livestock industry and the realisation that there is the need to reduce the total reliance on imported grain for livestock feeds, as far as possible, the Government has been forced to broaden its view and has been paying attention to the expansion of local production of corn, soyabeans and sorghums. As a result, the Government in conjunction with the Federal Republic of West Germany, has undertaken a feasibility project, the Charuaramas Agricultural Development Project, with the following specific terms of reference:-

- (a) to produce locally adapted varieties of corn, soya and sorghum; and
- (b) to determine the economic feasibility of a relatively large scale, highly mechanised system of local production of corn, soyabeans and sorghum; which are required as ingredients for livestock feed.

Essentially, the underlying policy behind these objectives is to shift, as far as these crops are concerned, from subsistence small scale farming as has characterised the corn programme to date, to large scale highly mechanised production.

In addition, to this local exercise, the Government has initiated, in conjunction with other regional governments, Barbados, Jamaica and Guyana, a Caribbean Food Plan, which has as its essential feature the investigation on the regional scale the possibility of large scale, highly mechanised production of corn and soyabeans to satisfy the needs of the Region's livestock industry.

Government's intervention in rice has had a relatively long history. The latest attempt, initiated in 1973, has been the result of serious shortages on the domestic market brought about by production set-backs in Guyana, our major supplier. The basic philosophy behind this decision is to reduce somewhat our total dependence on imported supplies on the basis of a commercialised production structure. At the same time the Government remains aware of its obligations under the Caricom Agreement.

We shall examine in turn the objectives and results of Government's policies towards corn/soyabeans and rice.

Section 2: The Cereal/Grain Programmes

The Corn/Soyabean Programme

Trinidad and Tobago has always paid marginal attention to its grain production, even after the livestock development programme has been launched. It was soon recognised that no attention had been paid to the supplies of feed for the developing livestock industry and the projected foreign exchange benefits of import substitution in this area were soon eroded by rapidly increasing foreign exchange costs.

Foreign exchange costs were increasing both for the purchase of initial stock (as was anticipated) and for the purchase of livestock feeds.

The Government of Trinidad and Tobago, becoming increasingly aware of the dissipation of the benefits of import substitution in purchase of

feed undertook in 1970 a joint project with the West German Government in the Tucker Valley, Chaguaramas. The project was termed the Chaguaramas Agricultural Development Project (CADP) and was concerned with the potential for developing local production of corn and soyabeans. This seemed to be a rational decision because there existed *a priori* evidence that these crops could be grown successfully in Trinidad and Tobago.

Results obtained: The seed breeding and testing programme is a long term programme of selection, cross breeding, and testing. The results so far indicate that significant success was obtained in producing varieties suitable to local production. The corn breeding programme is continuing apace and the results have been sufficiently encouraging so that the Government has decided to plant a further 2,000 acres in the area immediately east of the Golden Grove Road, Arouca.

There remains, however, the problem of producing seed, corn and soyabeans in commercially viable quantities to service any commercial enterprise that might be developed. One of the requirements for the seed production programme would be some separation from areas of commercial production. Plant breeders at the project suggest that if large local or regional commercial production is to become a reality, seed breeding in other territories may well be necessary.

The major concern at this point, however, is the feasibility of large scale production of corn and soyabeans in Trinidad and Tobago.

The commercial testing indicates that soyabean yield of 2,000 pounds per acre and corn yields of 3,000 to 5,000 pounds per acre have been achieved at Tucker Valley. Ignoring, for the time being, the yields achieved in the fertilizer trials, approximately 4,000 pounds per acre could be achieved from corn (Appendix Table 4).

However, two plantings are possible each year (May and November) under normal conditions, thus annual yields per acre can reach as much as 8,000 pounds of grain. In the two crops planted in 1972 and 1973, a high yield of 8,792 pounds was achieved with a crude average yield of 5,921 pounds per acre. (Appendix Table 5 provides a comparison with yields obtained in North, Central and South America.)

Possibilities of growing corn in two crops per year imply also that a rotation of one crop of corn and one crop of soyabeans is possible. It is thus possible to obtain 3,000 or more pounds of corn and 2,200 pounds of soyabeans per acre planted.

Unfortunately, it is not possible to determine accurately the economic returns of the project. In the first place, emphasis seemed to be placed on the technical rather than the economic feasibility of production. Thus only relatively small acreages have been planted. For the second crop 1972, 78 acres of corn and 18 acres of soyabeans were planted. For the first crop 1973, 142 acres corn were planted and mechanically harvested. A further 25 acres were manually harvested.

Resource Requirements: Successful corn/soyabean production in Trinidad and Tobago requires certain physical conditions. These include:-

- (a) rainfall of 60 inches per year, distributed in such a manner that a total of three weeks of dry weather is available for harvesting;

- (b) soils with good internal drainage so that the problem of water logging does not exist;
- (c) sufficiently flat land to allow for the use of heavy machinery; and
- (d) easy availability of infrastructural requirements.

These conditions, in addition to a further condition that sufficiently large acreages should be available for successful mechanical production indicate that a few areas in Trinidad qualify. The best areas are at present under intensive cane cultivation at Brechin Castle and Orange Grove. The whole question of the development of a corn and soyabean production complex is therefore intimately tied in with the question of rational agricultural policy, priorities and objectives. We shall return to this aspect of the problem in a later section.

For corn and soyabeans the limits of demand are however indicated by current levels of imports, although these are not easily adjusted to estimate for increased livestock production.

However, given the yields experienced at the CADP, and assuming that it is our intention to replace completely corn and soyabean imports, it appears that a minimum of 15,000 acres of corn would be needed to meet current needs. If soyabean needs are to be met also then a further 17,000 acres would be required (see Appendix Table 6). It would however be uneconomic in terms of physical land utilization to try to meet requirements in this way.

One way of meeting requirements is to attempt to say, meet soyabean requirements and derive what corn arises from rotating soyabean with corn. Thus, in order to meet 1973 demands 20,496 acres would provide the local demand for soyabeans in that year and also supply 81.9 million pounds (36,600 tons) of corn grain. In any case, it would require 15,000 to 20,000 acres of good flat mechanisable land in order to meet the demand requirements for corn and/or soyabeans in Trinidad and Tobago. And, of course, if the livestock industry is expanding (as it has been), additional acreages would be required to meet the increasing demand.

The Rice Programme

The fundamental objective of Government's new rice policy is to increase production by increasing the acreage under production from 16,000 acres in 1973 to 30,000 acres by 1978. The phasing calls for an increase of 5,000 acres in each year 1974 and 1975, and approximately 1,000 acres per year over the next three years of the plan. It is, however, specifically stated that the new acreages would not be obtained from land requiring high capital investment in reclamation.

The Government hopes that this programme for commercial rice production, will yield to farmers a reasonable level of income, comparable to workers of similar category in other industries, and at the same time provide a hedge against shortages from traditional suppliers, without undermining the importance of Guyana as a supplier under the Caricom Agreement. There is also the subsidiary aim of creating greater employment through utilisation of rice lands for vegetable production in the dry season.

These objectives are to be satisfied by the distribution of lands in 2 or 3-acre parcels.

Results obtained: It is yet too early to provide much empirical data as to the results of the rice programme in terms of production, since it was only initiated in 1974. With respect to specific activities, the major result recorded to date has been in the expansion of the acreage under rice cultivation through bringing 5,165 acres of new land into production, as well as providing infrastructural improvements on 3,850 acres previously used for rice cultivation (Appendix Table 7). For 1975, the plan calls for the bringing into production of a further 5,000 new acres. Discussions held with the Ministry of Agriculture indicated that the 1975 acreage target is likely to be met, as at the time of writing, approximately 4,000 acres had already been surveyed and mapped out.

On the production side, however, there is incomplete information as to the success of the increased acreage planted. Available information however, indicated that the Ministry bought approximately 100,000 pounds of paddy during 1974, which is being stored awaiting the opening of the processing mill now carded for October 1975. In effect, this implies that the Ministry has obtained control of only one per cent of the new acreage established.

Potential of the Rice Programme to Achieve Objectives: The proposed plan of action calls for the establishment of a total of 30,000 acres of rice by 1978 - 16,000 acres now under production to be improved, plus the addition of 14,000 new acres. These lands are expected to be obtained mainly from the Caroni and Nariva Swamps and the Oropouche Lagoon. It is therefore necessary as a first step in the examination to determine whether in fact these lands are available for rice cultivation.

However, the potential of land to be reclaimed for successful commercial rice production is determined not only on basic environmental agronomic features, but is also heavily dependent on the engineering aspects of supply and control of water and the mechanical characteristics of the soils within the area, which have tremendous influence on the costs of reclamation.

An examination of the resource potential of the areas under consideration indicates that:-

- (i) the water resource potential, particularly with respect to drainage and irrigation, is not good, especially in the Oropouche and Nariva areas. Whilst such potential could be developed elsewhere for use in the growing areas, the distances are generally too great to be developed without substantial capital investment;
- (ii) in the Caroni area, only approximately 4,800 acres, already partly developed for rice production, can be reclaimed at relatively low cost. the major part of the swamp, consisting of some 9,000 acres, poses enormous engineering problems that make the cost of reclamation prohibitive;
- (iii) the Oropouche Lagoon, possessing an area of some 4,000 acres earmarked for reclamation, whilst possessing some engineering difficulties brought about by ineffective previous attempts at reclamation, could be reconditioned at not too excessive costs; and
- (iv) the Nariva Swamp requires much more detailed engineering

analysis to provide a true indicator as to its use as a possible rice growing area. However, within this area there are some 1,200 acres known as the Plum Mitani Rice Scheme, which can be re-conditioned for rice production. The available evidence indicates that the bulk of the Nariva Swamp possesses similar engineering difficulties as the major part of the Caroni Swamp, which suggests that the cost of reclamation could be prohibitively high.

In conclusion, whilst the rice programme implies the availability of 14,000 acres of new easily developed land, the available evidence suggests that this new acreage may be only obtainable at very high preparation costs. It appears, therefore, that the easily utilised potential is probably no more than 20,000 acres, which had been previously developed to some extent. Investigation of a Ministry of Agriculture report, on the performance of the 1974 programme indicates that all the 'new' acreages developed were in underutilized old rice areas. (It may even be that these acreages are included in the 16,000 estimate of current production. But there is no clear evidence one way or the other in this regard.)

Production Targets: The stated production target of the rice programme is to provide a supplemental source of rice when traditional suppliers fall short, and as a subsidiary goal to utilise the rice lands in the dry season for vegetable production with the ultimate aim of making Trinidad and Tobago self-sufficient in vegetables. No specific production targets have, however, been set.

The Agricultural Development Bank, in its Development Plan 1974 to 1978, attempted to set such targets based upon the three nutritional factors of:

- (a) current per capita levels;
- (b) minimal levels for suggested balanced diets; and
- (c) desired levels for optimum nutrition.

In the case of rice, the plan suggested, the expansion of local production to meet the incremental requirements of the population, leaving imports at their current levels.

Under these assumptions, and at an assumed yield of 2,000 pounds paddy per acre (1,200 pounds rice) it would require by the year 2000, 46,000 acres to satisfy incremental requirements at current per capita levels. At minimal levels, the target is 74,000 acres, and at desired levels 103,000 acres (see Appendix Tables 8,9,10).

It is therefore quite obvious that the establishment of 30,000 acres to rice (assuming current yields) will not be able to satisfy the incremental requirements of the population at current levels much beyond 1990. Further, once rice continues to hold its current dominant role in the diets of the majority of the population, Trinidad will not be able to increase its levels of consumption to more acceptable nutritional standards without substantially increasing its ratio of imports of rice to its own domestic production.

It seems then, that the new rice programme of the Government is likely to have only a marginal effect on Trinidad's rice trading position. Even so, the objectives of the programme seem to be very difficult of achievement as indicated by:-

(i) the previous analysis on acreage availability for rice production which has raised the question as to whether in fact, we can readily establish 30,000 acres to rice; and

(ii) even if we assume that 30,000 acres can be established to rice, the implicit assumption here is that entire production would be channelled through the new commercial channels for the benefit of the population as a whole. This is highly improbable given the fact that rice is also a staple commodity in the diet of the growers themselves, and it will therefore be safe to assume that only surpluses above their immediate needs would be made available for general consumption. The evidence of 1974 supports this view.

With respect to the subsidiary goal of producing vegetables on rice lands during the dry season, historical performance has shown that this supplemental activity has only been attempted successfully on a very limited basis in a few areas, particularly the Caroni and Aranguez areas. For successful implementation of such a scheme, proper irrigation systems would have to be developed. However, it was pointed out previously that development of such facilities would be extremely costly.

Socio-economic Considerations: The other major objective of the current rice programme is the generation of an income to the farmer comparable to workers of equal status in other industries. The income level generally mentioned in discussions with Ministry officials was \$5,000 per annum. How far this aim can be satisfied will depend on the Costs and Returns analysis, which will determine the income expected to be derived from growing rice. Appendix Tables 11 and 12 provide a comparison of costs, and likely returns from various local sources.

The evidence of these tables suggests that even under the best assumptions of gross margins as indicated by the Land Capability Study, Phase II, it would take approximately 8 acres to provide a gross margin of \$5,000 per year in rice. Compare this with the 2 to 3-acres projected in the programme. Moreover, the evidence suggests that the Land Capability estimates of yields are at least 50 per cent too high.

Note on Wheat

Appendix Table 1 shows that domestic consumption of wheat is met entirely by imports. It is not possible (agronomically) to produce wheat in Trinidad and Tobago.

The idea of producing flour from alternative sources to wheat, e.g. cassava, sweet potatoes, banana, has gained some ascendancy within recent times, and, in fact, several experiments have been undertaken, principally at the University of the West Indies, to prove the technical feasibility of this project. However, the results of the experiments indicate that it is not possible to substitute completely wheat flour in normal preparations requiring the use of flour. A substantial amount of wheat flour will therefore still have to be imported. However, since this project is still in the experimental stage, for the purpose of the present exercise, it will be assumed that the level of domestic demand for wheat (flour) will be met through imports. No analysis will therefore be undertaken to consider the possibilities for production of local alternatives.

Section 3: Implications of the Development of Cereals/Grains in Trinidad

The evidence presented so far in this paper supports several conclusions:-

(i) the land requirement for supplying current levels of utilization of corn and soyabeans are quite high and in any case would fully supply only one or other of these products. Under conditions of two crops available per year, either all the current demands for corn alone could be satisfied, or else the total demand for soyabeans and a per cent of the demand for corn;

(ii) the land resources suitable for this enterprise, both in terms of expanse and in terms of other characteristics, are at present largely under sugar cane production;

(iii) even if the proposed rice programme is successful, it would achieve at best only a retardation in the rate of imports, but it would not be able to arrest that rate of growth or turn it around; and

(iv) it is impossible at this time to consider the view that wheat may be produced locally or significantly substituted for in present flour preparations.

These conclusions have a definite bearing on the choice of national development strategy. The alternatives open to us are:

- (a) self-sufficiency on an individual basis;
- (b) self-sufficiency on a regional basis; and
- (c) in the effort to achieve local self-sufficiency, replace the sugar industry by a large scale corn/soyabean/livestock industry.

We shall deal with the questions of local self-sufficiency and competition with sugar first.

With limited land resources of limited potential, Trinidad and Tobago could achieve self-sufficiency in only a relatively narrow range of goods comprised to the long list of consumer preferences. To opt for this policy is to limit the potential of the economy in the long run.

In any case, even when the rational limits of the programme of self-sufficiency and import substitution are defined the choice of crops could be critical. It is here that the second aspect of this problem becomes important. There are two dimensions to this question. The first relates, of course, to the present buoyancy of the sugar industry. Whilst this is obviously short term, it is nonetheless an important criterion. Moreover, there is an employment dimension in this problem which must be considered.

The other dimension of the problem is related to the cost of providing energy and protein supplies to livestock in the Trinidad context. Molasses can supply energy (TDN) to cattle at a rate of approximately 16 cents per pound while corn costs approximately 24 cents per pound TDN. On the protein side, the cost of effective protein supplied by urea is approximately 10 cents per pound while soyabeans cost 67 to 77 cents per pound protein. It would then seem to be a more rational strategy to develop other sources of livestock feeds as long as they are cheaper than locally produced corn and soyabeans. Of interest here are the use of offals from processing industries, e.g. fish and also the use of the comfith with molasses/urea.

The final dimension of the cereal/grain development problem utilizes the regional rather than the national approach to self-sufficiency. On corn and soyabeans, this demands, that to the extent required for Trinidad (it is not possible to full feed molasses/urea) or to the extent that corn and soyabeans are produced more cheaply in these areas of the Region - Guyana and Belize - with lots of under and unutilized land, that imports should be diverted from extra-regional to those intra-regional sources. This idea is not new and is currently receiving the attention of regional governments.

With regard to rice, we have shown that large scale imports will continue. To the extent that rice is a profitable crop on lands largely not suited to other crops, that the development of this crop should certainly be encouraged. Nonetheless, it must be borne in mind that whilst some benefits are to be derived from local rice production to the extent possible, it seems extremely rational to continue the importation of rice from within the region.

The underlying view of the paper is therefore that the development strategy that Trinidad and Tobago should follow is regional rather than local, since this broadens the limits on the potential of the economy.

In short, the following local development strategies in small economies such as Trinidad and Tobago may not yield the highest rates of growth in the economy.

Nonetheless, it is our view that local development of the cereal/grain industry should be pursued to the extent that such production is economically viable on both private and social grounds, including the consideration that such efforts are not inimical to the overall regional development strategy.

References

1. Ministry of Agriculture, "Rice Programme", unpublished statement, 1974.
2. Pantin, D.A. *The Economics of Rice Production*. U.W.I., 1974.
3. Ahamad, N. *Problems and Possibilities of the Rice Crop in Trinidad*. U.W.I., 1974.
4. Phelps, H.O. *Drainage and Irrigation for Rice Growing in Trinidad*. U.W.I., 1974.
5. Ministry of Agriculture, *Costs of Production for Rice, 1974*. C.E.S., T.I.R.G.A.
6. Benson, E.G. *A Survey of the Rice Industry*. Statistical Studies Paper No. 2, 1953.
7. Benson, E.G. *Advice to Farmers on Rice Production*. Dept. of Agriculture, U.W.I., 1953.
8. Ministry of Agriculture. "Rice Committee", unpublished Minutes of Meetings.

9. Ganpat, Roop. *Cultivation of Swamp Land Paddy*. C.E.S. Bulletin No. 24, 1974.
10. Ministry of Planning & Development. *Land Capability Studies, Phase II - County Reports*. 1972.
11. Government of Trinidad & Tobago. "Oil and Food". Basic Discussion Paper, 1975.
12. Agricultural Development Bank. "Development Plan 1974-78". ADB, 1974.
13. C.S.O. *Overseas Trade Reports*.
14. C.A.D.P. *Annual Report*, 1973.

Appendix Table 1. Domestic Production and Imports of Cereals/Grains

	1969	1970	1971	1972	1973	1974 Jan.-Oct.
	(million pounds)					
<u>Corn:</u>						
Local production	n.a.	n.a.	n.a.	8.3	8.3	n.a.
Imports	117.4	103.0	129.5	137.0	159.8	111.9
<u>Rice:</u>						
Local Production	21.6	22.7	23.3	27.1	27.1	n.a.
Imports	65.1	61.1	74.7	66.2	25.2	n.a.
<u>Wheat:</u>						
Imports	207.1	127.8	144.7	114.4	173.7	n.a.
<u>Soyabean meal</u>	15.7	33.1	40.2	35.6	41.0	43.8

Source: 1. C.S.O., *Overseas Trade Reports*.
 2. Grain Terminals Ltd., unpublished data.

Appendix Table 2. Acreage and Output of Corn and Rice by Holding Size; 1963

	Green Corn (ears)	Dry Shelled Corn (lb.)	Rice (paddy) (barrels)
<u>Acreage:</u>			
1-4	369		3,227
5-9	1,151		3,238
10-24	853		2,054
24-49	241		363
50+	110		100
Total		2,734*	8,989
<u>Quantity:</u>			
1-4	677	1,370	38,631
5-9	344	1,050	24,960
10-24	260	686	27,864
25-49	58	121	3,482
50+	8	48	989
Total	1,336	3,275	95,927

*Includes green corn (ears).

Source: C.S.O., *Agricultural Census Report*, 1963 bulletin.

Appendix Table 3. Increase in Demand 1974-1978 at Various Consumption Levels for Rice and Wheat.

			('000 lb.)
	Current	Minimal	Desired
Total	21,087	67,943	129,663
Rice	9,006	30,574	58,348
Wheat	12,081	37,369	71,315

Source: A.D.B., *Development Plan 1974-1978*.

Appendix Table 4. Results of Commercial Production Testing Trials: Yields.

							(lb./acre)
	2nd Crop Aug.	1972 High	1st Crop Aug.	1973 High	Fertilizer Aug.	Trials High	
Corn (grain)	2,744	3,908	3,177	4,884	4,590-5,213	5,445	
Soyabeans	2,041	2,041					

Source: Chaguaramas Agricultural Development Project, *Annual Report, 1973*.

Appendix Table 5. Comparative Results of Tucker Valley Trials to Other Corn Yields in North, Central and South America.

Country	Yield (kg/ha)	
South America	(Aug.)	1,630
North & Central America	(Aug.)	3,480
Trinidad & Tobago	(Aug.)	3,100 (2nd Crop 1972) 6,661
Trinidad & Tobago		3,561 (1st Crop 1973)
Trinidad & Tobago	(High)	4,381 (2nd Crop 1972) 9,855
Trinidad & Tobago	(High)	5,474 (1st Crop 1973)
United States of America		4,500
Canada		5,290
Mexico		1,200
El Salvador		1,350
Argentina		2,330
Chile		3,590
Bolivia		1,420
Brazil		1,470
Peru		1,680
Columbia		1,250
Paraguay		1,290
Venezuela		1,120

Source: Chaguaramas Agricultural Development Project, *Annual Report, 1973*.

Appendix Table 6. Acreage Requirements to Replace Imports of Corn and Soyabeans.

Year	Corn			Soyabeans	
	Imports ('000 lb.)	Acreage 2 Crops	Acreage 1 Crop	Imports ('000 lb.)	Acreage
1971	129,521.3	16,190	32,380	40,248.3	20,124
1972	127,751.4	15,894	31,788	35,577.9	17,789
1973	159,785.9	19,973	39,946	40,992.0	20,496
1974 Jan.-Oct.	111,901.4	13,988	29,975	43,832.0	21,916

Appendix Table 7. Acreages Established to Rice in 1974.

Country	New Acres	Acres Improved
Caroni	1,475	800
St. George	775	400
Nariva	1,250	350
Mayaro	235	150
St. Patrick	680	1,900
Victoria	750	250
Total	5,165	3,850

Source: Government of Trinidad & Tobago, "Oil and Food" - Basic Discussion Paper, Jan, 1975.

Note: Essentially the works undertaken have been the provision of necessary infrastructure for effective water management in the named areas and consisted of:

- (i) establishing 95,000 feet of new drains;
- (ii) clearing 180,000 feet of main drains;
- (iii) building of 36 new sluice gates;
- (iv) repair of 20 old sluice gates; and
- (v) construction of 65,000 feet of access roads and embarkment.

These works were undertaken at an estimated cost of approximately \$600,000 which was provided out of the "Special Food Fund" set up as a feature of the 1974 Budget.

Appendix Table 8. Total Consumption Demands for Cereals for Selected Years to the Year 2000.

Consumption Levels	Per Capita Consumption (lb./annum)	1974	1979	1985	2000
		Pop. 1.128m.	Pop. 1.248m. ('000 lb.)	Pop. 1.386m.	Pop. 1.837m.
Current	175	197,313	218,400	242,550	321,475
Minimal	218	246,171	272,480	302,148	400,466
Desired	262	295,405	326,976	363,132	481,294

Note: Population Expansion projected on the basis of 1.9% increase per annum.

Source: A.D.B., *Development Plan, 1974-1978*.

Appendix Table 9. Incremental Requirements for Cereals for Selected Years to Year 2000 Using 1973 as Base Year.

Consumption Levels	Consumption	('000 lb.)		
		Incremental	Requirements	
	1,973	1,979	1,985	2,000
Current	193,638	24,762	48,912	127,837
Minimal		78,842	108,510	286,828
Desired		101,767	169,494	287,656

Note: Examination of the cereal requirements shows that the composition of this group comprises wheat (flour) and rice, with the ratio of flour imports being approximately 57% of the total. Our estimates of rice requirements assume that the ratio of flour imports would remain constant.

Appendix Table 10. Incremental Requirements and Required Acreages for Rice Production: For Selected Years to Year 2000.

Consumption Levels	1979		1985		2000	
	Incr. Req. ('000 lb.)	Acreage	Incr. Req. ('000 lb.)	Acreage	Incr. Req. ('000 lb.)	Acreage
Current	10,648	8,873	21,032	17,527	54,970	45,808
Minimal	33,902	28,252	46,659	38,883	88,970	74,113
Desired	43,760	36,467	72,882	60,735	123,692	103,077

Appendix Table 11. Comparison of Costs of Production Per Acre of Rice (1974)

Agency	Cost/Production Acre (\$)	Cost/Pound Paddy (¢)	Acreage/Yield/Acre Paddy (lb.)
Central Experimental Station	843	28.1	3,010
Farmers (as Est. by C.E.S.)	474	18.8	2,500
Farmers (T.I.R.G.A.)	785	31.4	2,500
Land Capability Phase II Reports:			
St. Patrick	425	11.4	3,728
Caroni	410	13.7	2,992
Victoria	430	11.6	3,707
Nariva/Mayaro	420	11.2	3,750

Source: Ministry of Agriculture, Rice Committee Cost Comparison, unpublished.

Note: T.I.R.G.A. - Trinidad Islandwide Rice Growers' Association.

Appendix Table 12. Comparison of Gross Margin Analysis per Acre at Government's Guaranteed Price (28 cents per lb.) for Paddy: 1975.

Agency	Cost/Production Acre (\$)	Gross Revenue	Gross Margin
Central Experimental Station	843	843	-
Farmers (as Est. by C.E.S.)	474	700	226
Farmers (T.I.R.G.A.)	785	700	(85)
Land Capability Phase II Reports:			
St. Patrick	425	1,044	619
Caroni	410	838	428
Victoria	430	1,038	608
Nariva/Mayaro	420	1,050	630