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Preliminary Analysis  
and Critique  
of

GUYANA: ASSESSMENT OF  
FOOD CROPS SUBSECTOR

prepared by  
Dr. Gene Mathia  
in compliance  
with the requirements of

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## PREFATORY NOTE

This critique of an Agricultural Food Crops Subsector Assessment prepared by Robert E. Nathan Associates was conducted in preparation for an on-site review and subsequent program recommendations. Conditions beyond the control of the contractor or his consultant, prevented completion of the on-site review. Readers should be aware that such a review might alter some of the observations and conclusions of this report.

## Introduction

A study of Guyana's foodcrop sector, financed by the U.S. Agency for International Development and conducted by Robert E. Nathan Associates, Inc. of Washington, D.C., was completed and the results presented in an unpublished report dated June 30, 1974. The purpose of the assessment was to provide information needed for planning and executing policies pertaining to the foodcrops sector by the Government of Guyana and its several planning agencies.

This critique of the assessment is divided into three separate parts. The first section will provide a rather broad summary of the assessment report. The second section will deal with the report quality by evaluating the assessment as to accomplishment of contract objectives. The last section will present an outline of a follow-up procedure which will provide the Government of Guyana USAID/Guyana with useful planning information and a policy decision-making framework.

### Summary of Assessment Report

The contractor agreed to analyze the production, marketing and related subsystems comprising the foodcrops subsector, identify the major constraints within the respective systems, develop a time-phased investment plan designed to lessen or eliminate constraints within the resource, cultural and political systems and to develop a plan to improve the planning capabilities and the data base of the Ministry of National Development and Agriculture. Needless to say, these performance guidelines are rather broad, and as such, any evaluation of how well the contractor accomplished these broad objectives must be rather general.

The major contribution of this assessment report was its rather systematic presentation of secondary data. Of secondary importance was a farm survey designed to collect primary data on farm and farmer characteristics. A yield survey for selected crops was also conducted. There were noticeable gaps in the secondary data, many of which may limit any effort in regionally and temporarily relating farm level production, marketing and final consumption. For example, little useful data were presented on consumption of farm products on farms where grown. The relative importance of the "commercial" sector of agriculture to the "subsistence" sector was not described nationally or regionally. Also, productivity coefficients for resource inputs used by farmers were not adequately presented; e.g., how foodcrop production responded to the application of fertilizer, water, and other resources. Data concerning the entire structure, performance and efficiency of marketing firms were not provided.

The assessment began with a presentation of the second five-year (1972-76) National Plan for Guyana. Several broad classes of foodcrops were considered in the National Plan. They were also selected for the evaluation by Nathan Associates. These were oil crops (coconuts, soybeans, and oil palm), provisional crops (plantains, ground provisions and white potatoes), vegetables (cabbage, tomatoes, onions and carrots), fruits (citrus, bananas and pineapple), and pulses and nuts (black-eye peas, peanuts and split peas). These commodities comprised the more important products in all classes except for vegetables. The four vegetables selected for analysis represented a very small fraction of total vegetable production, possibly less than 20 percent. The contractor made no effort to correct this deficiency in the National Plan. Therefore, several major foodcrops were not considered by

either study group.

The second Five-Year Plan of Guyana was strong in setting target production and consumption but rather weak in developing and executing strategies for reaching these targets. Evidently this same pattern unfolded for the first Five-Year Plan. The assessment report appraised the foodcrop targets of the second National Plan. It pointed out rather successfully that the National Plan specified rather unrealistic foodcrop targets for some crops. This conclusion was drawn by comparing the targets presented in the National Plan to national production-consumption balances developed in Chapter 3 of this assessment.

The contractor's estimates of consumption-production balances were based primarily on the 1970 Consumer Expenditure Survey and took into account projected shifts in apparent demand due to population and income growth as well as movements along the demand schedules due to anticipated shifts in supply. Consumption levels were estimated by selecting assumed income and direct and cross-price elasticities. Extension of trends in income, population and price levels was assumed to be linear through 1981. It is doubtful that consumption estimates are very sensitive to the above assumptions. However, some testing of sensitivity of estimates to the above assumptions would have been helpful.

Production-consumption balances including foreign trade for 1972 as presented in Tables 24, 25, 26, 27 and 29 were fairly compatible with disappearance data presented in Appendix Tables B-1-8 of the report except for plantains (22,400,000 lbs. vs. 51,799,000 lbs in 1972), ground provisions (38,000,000 lbs. vs. 60,416,000 lbs.), and bananas (9,800,000 lbs. vs. 14,800,000 lbs.). Discrepancies of these magnitudes need further elaboration. Product classification may be the problem; however, consumer survey

data are not known for accuracy. Total consumption estimates derived from such per capita data can be very unreliable.

After the production-consumption outlook projections were presented, the report presented a description of the foodcrop production subsector. This section was relatively successful in describing the general resource situation in Guyana. In essence, the report dramatized the importance of soil infertility and variability, water availability (flooding and droughts), land tenure insecurity, labor immobility, and prevalence of insects and diseases of the tropics in creating high risk if not uncertain farming conditions for all crops including rice and sugar cane. The lack of experience in producing a wide variety of foodcrops in Guyana is another production constraint, although this report suggests that the quantity of management talent is relatively high. Also, the literacy is relatively high. It implies that management in Guyana should not be considered a major development constraint; i.e., redundant management capability and redundant labor are located on many farms. If this is true, the quantity of management talent in the country will be an asset in any plan to develop the interior.

The quality of management talent, although maybe sufficient in quantity, may be questionable if attitudes concerning the use of farm credit, the interest in moving to new areas, and the use of fertilizer, insecticide and water are accurately described in the report. For example, the report contains the following statement: "only an occasional respondent indicated that he might use more fertilizer and other input materials if production credit were available: (page 175). The unresponsiveness to changes in relative prices in production plans also suggests that management quality is relatively low. It may be that risks of disastrous failures in foodcrop

production are extremely high. Also, one would suspect that most farmers may have become convinced that farm inputs such as fertilizer and insecticide are not available in the market place, so why worry about their uses. Many of the statements concerning the availability of management were based on the farm survey. Regarding management skills and attitudes, however, the survey of 321 farms is not very representative and may be very misleading. The survey results should probably not be generalized to the country as a whole.

The assessment was very weak in presenting production cost data. More will be said about the lack of production cost data in the concluding sections. Regional variations in production costs by products would have been very useful information in separating the management problems from other problems created by external conditions (risks and uncertainty).

A description of the marketing of farm products suggests that large quantities of farm products pass through commercial marketing channels (see Table 38, page 186). These data suggest that marketing costs are relatively low in that the farmers' share of the retail dollar is relatively high (see Table 37, page 180). In fact, the farmers' share was greater than 60 cents on the dollar for all the foodcrop items (Table 37). This is almost double the farmers' share in the United States for most of these items. These data and the inferences drawn from them are questionable. One wonders if transportation costs are accurately reflected in these marketing costs. More realistic estimates appeared in Table 45 (page 217). The discrepancies noted in Tables 37 and 45 need further clarification by the contractor.

The major bottleneck in the marketing system in Guyana does not appear to be a lack of competition. On the other hand, too much competition (too

many small inefficient firms and a limited volume of product), may and often does result in relatively high marketing costs. The report indicated that extremely high losses of perishable food crops were noted. These losses caused much uncertainty in product quality and price determination. Therefore, the information mechanism cannot function adequately at any level of the marketing system. It appears that Guyana, like many other developing countries, is using the food marketing and distribution systems to alleviate critical unemployment problems. Needless to say, this approach substitutes underemployment for unemployment and creates serious inefficiency and health problems. The lack of efficiently operated facilities for marketing apparently is a constraint. With the small volume available for processing, it is doubtful that economic units can be established without heavy government subsidies and a costly export expansion program. Critical problems in product assembly and high transportation costs coupled with limited volume suggest that processing food products in the near future should be limited to cottage industry type processing; i.e., canning kitchens using labor-intensive technology.

The discussion on institutions and the performance of the farm input subsector very quickly points out the problem in foodcrop development. The institutions, both public and private, which are responsible for the generation and dissemination of information and the extension of production credit are concerned with general agriculture. Cash crops usually receive the attention not only in Guyana but in most other countries. Most foodcrops are specialty commodities and require a high level of management sophistication. Unfortunately, effective research and extension results have to be commodity specific.

The professional staff of the Agricultural Ministry as listed in Table 49 (page 240) is not very impressive in terms of numbers and professional degrees. Also, a relatively large share of the national budget allocated to food crops is earmarked for stabilizing farm prices. These facts suggest that little public effort is expended for solving either short-run or long-run production and marketing problems pertinent to the foodcrops subsector. Even then, the output resulting from these limited inputs is probably not very great given the rather heavy administrative load of most civil servants as indicated throughout this section. Adaptive research got underway several years ago, but results from even the older pilot projects are not ready for extension dissemination; i.e., clear statements cannot be made about the technical feasibility of growing potatoes, tomatoes, onions, soybeans and oil palm. Economic feasibility in growing these crops can only be evaluated after productivities of these crops are well established. The need for an applied research program on product adaptability by regions is essential for developing the foodcrops group. Of course, the structure designed to distribute the results of adaptive research should be undertaken at the same time so as to insure that maximum payoff results from research expenditures.

The analysis of land settlement projects was rather superficial. The establishment of settlements in the interior is apparently a stated policy of the government but one suspects that they have not moved much farther than paper plans. At least investments in infrastructure required in attracting and holding settlers in these remote areas have not been integral parts of the project. This looks like a very fertile area for obtaining international banking participation.

The evaluation of cooperative organizations pointed out some general pitfalls of cooperatives but presented little data on cooperative

activities, functions and performances. It did wisely indicate that caution should be exercised in forming coops with the expectation that they can solve problems in marketing and credit which private enterprise was unwilling to solve.

Production, consumption, and product and input marketing were combined to outline strategies for developing the foodcrop subsector. It is in chapter seven that the alternative production and marketing programs are evaluated. Two broad issues are described. First, increasing output is limited by either expanding crop acreage or increasing yields per acre. The second issue deals with whether Guyana really has the goal of becoming self-sufficient in each individual foodcrop, or of producing foodcrops for which Guyana has a comparative advantage. It is in this section that projected production requirements in 1976 and 1981 are compared to the 1972 level. Only modest production changes in percentage terms are required for most of the foodcrops to reach 1981 projected demand targets. These targets could be reached by 26 percent or less increase over 1972 production. Pineapples were an exception. For many crops in the United States, fluctuations in production levels from year to year are greater than the percentage increases required by these targets in Guyana. It should be noted that the base for calculating percentage changes in the United States is much larger than the Guyana base.

The constraints to achieving self-sufficiency by a program designed to increase yields were cited. First, most crops do not respond to the sole use of selected inputs such as fertilizer and insecticides until new varieties and cultural practices are adopted. In other words, higher yields require new technologies in addition to educational efforts directed at changing attitudes and improving the state of knowledge.

Second, increasing yields by adding new inputs and technologies requires larger and larger cash outlays by farmers. Risks in production and marketing are too great to get farmers to assume the increased risks of increasing cash outlays. Guyana does not produce many of the inputs required for increasing yields. Thus, they must import these inputs during a period in which world prices will likely increase sharply.

Finally and possibly more important than those constraints discussed above is the fact that increasing yields on existing acreage through improved management practices will require effective water control and different price policy incentives. Problems of water control (floods and droughts) are primarily external to the individual farmer. The political system in Guyana does not appear very well adapted to deal with these externalities.

These are rather convincing arguments for not embarking on a major campaign to reach target production goals by increasing yields. This should not be interpreted as a mandate to terminate research and extension activities designed to increase yields. Evidence suggests that large expenditures on adaptive research will be necessary to prevent declines in yields in major food crops as marginal land is brought into production.

The second alternative of expanding acreage does look attractive since fertile land is available in the interior. However, several constraints are obvious from the assessment report. First, there is a lack of labor and service facilities in these areas. Also, the ability of the government to finance settlement projects involving land clearing, road building, and water control at a level which will attract capable farm managers is questionable. The report wisely pointed out several questions concerning expanding acreage:

- (1) Can new lands be prepared for cultivation; i.e., cleared, drained, and irrigated?
- (2) Can production and consumer credit be provided to assist the settlers during the early years?
- (3) Can land tenure problems be resolved such that ownership rights are clearly established?
- (4) Can transportation and marketing services be provided to these new areas at competitive costs?

The choice between either acreage expansion or increased yields is not made in this assessment. This is probably a wise course of action since a framework for evaluating the costs and returns from alternative courses of action was never formulated in this report. The choice is not clear cut. It will probably take both courses of action with one or the other of the choices being more important for a given region. Several courses of action which would be complementary to increased output from either choice were mentioned in this chapter. Some of these were the need for additional processing facilities for oil crops, cassava, and a multi-product facility for fruits and vegetables; improved packaging and transportation of perishable products; the formulation and execution of grades and standards; and improvement in market information. Other suggestions for increasing output in Guyana were made in a general way. The list of these suggestions looked like the table of contents of a book on farm management and marketing principles.

Other methods for reducing losses in harvesting and marketing processes such that target outputs could be reached were not considered. The reduction of marketing losses of current production levels may prove easier than increasing yields or adding more acreage to production.

Another method for increasing output which would flow through commercial marketing channels might be to institute a program to increase the marketing surplus from subsistence farmers and to reduce the level of on-farm consumption of these foodcrops by commercial units.

Data were not presented in this report to evaluate the above methods of increasing output. However, they offer opportunities for increasing marketed output without increasing total production. Further study of these potentials looks very profitable for Guyana.

The report concentrated heavily on the need for expanding output. Very little is said about consumption patterns and whether the price elasticity of demand is very responsive to output level. Price elasticities presented in Table 17 on page 65 and Table A-9 on page 413 are considerably more elastic than one would expect. The complicating feature of using price and income elasticities to estimate annual consumption for foodcrops is that seasonal variations in production are extremely large. Consequently, average annual elasticities with respect to both income and price are not representative during most of the year. As a result, fluctuations in seasonal output cause wide fluctuations in prices and farm income. Elasticities of demand in space and time are needed for more accurately projecting consumption. The data required to estimate these elasticities probably are not available but efforts to collect such data should not be delayed.

The third link in the chain which received little specific attention is the capacity of the marketing system to handle additional volumes in the future at current marketing costs or margins. Considerable evidence exists which suggests that marketing margins increase over time because of

increasing demands for additional marketing services. This is especially true if marketing of foodcrops requires more processing in the marketing channels.

#### Accomplishment of Performance Goals

The contract AID/1a-1035 listed six major performance objectives. These were rather broad in scope but their accomplishment would be germane to planning in Guyana. The first objective was to identify and describe the significant elements of production, marketing, agribusiness and other major subsystems for selected foodcrops. In essence, the entire assessment report is little more than a description of the production and marketing systems at the broadly aggregate or national level. The only qualification of production and marketing subsystems pertained to the estimation of production-consumption balances at the national level for each of the foodcrops. This quantification was limited to linear projections analyses. Few economists would consider linear projections of trends to be very analytical and often not very adequate. Nevertheless, this objective was fairly adequately accomplished with the exception of a good description of level of technology used regionally in farm and marketing firms.

The second performance objective required regionalizing the flows of goods and services. The contractor was not successful in achieving this objective. The volume and seasonality of production and marketing were not evaluated on a regional basis. In fact, one of the major weaknesses of the report in general was its lack in presenting regional production and consumption patterns and how regional flows of products affected product prices. A model was never developed to make any such comparisons. Regional price patterns associated with product flows

were not presented for any level in the production-marketing system or for any time period. It is difficult to see how any meaningful development and investment planning can occur without production, consumption and price data on a regional if not smaller unit basis.

The contractor might claim that production-consumption balances by products for 1972-76 and 1981 constitute the fulfillment of this second objective. These estimates do not have form, temporal or spatial dimensions. Little evidence is provided to indicate which product should be produced in which area of Guyana, during which time period or in which form. Consequently, they are of little use in regional planning.

The third objective was designed to evaluate the capacity (human and physical) of the present system and relate this system quantitatively to the capacity of a system required to meet realistic goals. The analysis of system constraints was to be undertaken after the various systems had been regionally and nationally identified, described and analyzed. As pointed out above, neither the production system nor the marketing network was regionalized quantitatively. Therefore, the contractor could only identify constraints in a general way. For example, transportation was cited as a constraint in moving farm inputs and products. Furthermore, the lack of water control and the lack of production inputs were cited as general constraints. These are constraints in developed and developing countries. For planning purposes, however, the specific parameters or relative magnitudes of these constraints are required. Without these constraint parameters, it is impossible to specify the nature and magnitude of the investments required and the potential payoffs of lessening or eliminating the constraints.

The fourth performance objective was a listing of system constraints to development and array all constraints identified in the order (time-phased) in which investment must be made. Time-phasing investments require a regional plan which contains anticipated solutions to problems arising from bottlenecks in the system. The analytical framework needed to construct a regional plan was not developed and quantified sufficiently to schedule investments. Unfortunately, the framework and the data are still not available to accomplish this very important objective.

The fifth goal of providing a plan for an improved basis for policy development and to identify future study and feasibility requirements was not satisfactorily accomplished. Some broad recommendations were made on how data sources could be improved, how program and project monitoring could be made more effective, and how foreign exchange and local currency could be managed by Government to improve agricultural planning. However, the recommendations were so broad that it is difficult to see how the GOG and USAID/Guyana could use them in their project planning. Expected costs and payoffs from alternative courses of action were not presented in this assessment report. These data should be generated before courses of action are recommended and decisions made by the government.

The sixth objective was the development of subject matter content, time frame, budgetary requirements and other components of a long-term training program designed to improve the analytical capabilities of the Ministry. This task was to be performed in cooperation with GOG and USAID/Guyana. It may have been accomplished informally. However, there is little evidence of such a program included in this report. There are suggestions that training could be provided in existing Guyanese

educational institutions; some might occur through on-the-job training; but much of it would likely require assistance from external sources. These are obvious solutions to the training problem but what size of program will be needed and what are the expected costs and returns? Another question would be the form of external assistance; i.e., send students abroad or recruit foreign experts for long-term assignments in institutions of Guyana?

### Situation Analysis

As mentioned in the previous section, the basic problem with the assessment report is its lack of a satisfactory analytical framework. There is a need for a structural framework which relates production and consumption regionally with price surfaces. A perfect market model could serve as a basis of comparisons of results derived by spatial and temporal programming. The idea of comparative advantage advantage by products among regions of the country in performing production, transportation and distribution activities is critically needed. It is impossible to identify areas which have growth potentials for specific foodcrops unless comparative profitability of production of every crop is known by regions.

Comparative analyses require the following data:

- (1) Resource base (quantity and quality of land, labor, capital, water, management, etc.) by relatively small geographic units (much smaller than the 12 to 14 regions).
- (2) Production response data by crops (foodcrops and alternative enterprises) for owned and purchased inputs by geographic unit.
- (3) Prices of owned and purchased inputs by geographic area.
- (4) Methods and costs of transporting products from production sites in each geographic unit to intermediate and final markets taking

into consideration volume, perishability of product and losses due to in-transit problems.

(5) Marketing functions and costs associated with transforming the raw product to usable consumer products; i.e., costs of packaging, processing, grading and sorting, wholesaling, and retailing.

(6) Consumption of each product by region as a function of price, income and other economic and social determinants.

These data need to be collected for a base period (1972-75) such that spatial and temporal analyses can be performed. With this framework and subsequent analyses, various policy changes affecting future courses of action could be evaluated along with anticipated changes in demand and supply. Many studies of the above nature have been conducted in the United States and other countries. At least one such attempt has been made in Guyana. A study of regional development potentials in Guyana was conducted by John L. Dukhia under the direction of Larry Martin. The results of this study were presented in a thesis entitled "Regional Agricultural Planning in Guyana--A Mathematical Programming Approach." This thesis was submitted in partial fulfillment of the requirements of an M. S. degree at the University of Guelph in 1973.

This thesis used a framework for regional analysis which considers regional comparative advantages. It may be useful to take a look at the technique and results of this study. Four alternative models were considered in the study. In the study, Guyana was divided into 12 agricultural regions. The target year was 1976. Production and consumption patterns by regions and interregional transportation costs were estimated for the following crops: corn, cabbage, onions, peanuts,

black-eye peas, cassava, plantains and provisions. Several of these were also considered in the assessment report.

Several limitations of the analysis were cited. Some of the more important limitations which would limit the practical usefulness of this or any similar analysis were the following:

1. Specification of the regions was arbitrary;
2. Production costs and yields within broadly defined regions are not very homogeneous and highly varied overtime;
3. Constant returns to scale were assumed;
4. Consumption was not adequately related to price and income;
5. Export demand was considered in one model but rather superficially;
6. Yields were relatively high compared to yield data in other sources; and
7. Several major cash crop alternatives in the coast were not included.

The regional trade flows as determined by Dukhia for selected products are interesting and may be useful indicators to planners in AID and the Government of Guyana. With projected production and consumption levels for 1976, production and transportation costs were minimized to determine regions which have a competitive advantage and to determine the optimum flow patterns. The interregional flow patterns for selected products were reproduced from the thesis and are presented in Appendix Tables 1-6.

The production and flow patterns for cabbage are interesting in that the Coast is the major producing region and would be expected to provide other regions with cabbage. The Upper and Central Mazaruni, Pakaraima and Kanuku-Kuyuroini regions are self-sufficient. This solution was

rather stable as indicated by the results of sensitivity analysis presented in the thesis (shadow prices).

The same general patterns resulted for plantains, provisions and cassava. The Coast had a comparative advantage and was the major producer of these crops. It was the only region which supplied other regions with these products.

The patterns for peanuts and black-eye peas were considerably different from the above crops. For peanuts, the Central Mazaruni region had a comparative advantage although the Kunuku-Kuyuwini region produced more than that region could consume. The Pakaraima region was self-sufficient in peanut production.

The Central Mazaruni and Soesdyke-Linden regions had a comparative advantage in black-eye peas. Both of these regions produced and shipped large quantities to other deficit regions. The Coastal region was the major importer of peas.

As pointed out earlier, the Dukhia study is not sufficiently complete for making current policy decisions. However, it does illustrate the type of framework which can be used to provide information that is needed by policy makers. With more accurate and complete specification of production, consumption and transportation cost data, expected costs and returns from alternative courses of action can be estimated.

The basic constraints to increasing foodcrop production are very regional in nature. The Dukhia report and the assessment report rather clearly showed that the limiting factors in the Coast apparently are economic rather than technical in nature; i.e., foodcrops are either not as profitable as other alternatives (rice and sugar) or the risks of not earning competitive returns to resources are extremely high. Technical

constraints are operating in the Coastal region but these could be resolved by investments in currently known technology and government programs designed to provide the incentive to modernize coastal agriculture. Technical constraints involving currently unknown technology may be much more important in regions other than the Coast.

Income variation from foodcrops is likely to be a serious constraint in all regions. An important question is whether the risks are due to yield or price fluctuations. Variations in yield could be overcome by a crash effort in applied research and the dissemination of information by Extension. Such an effort would need to incorporate a promotional campaign. Price variation could be approached by a price support program (price floor) similar to the one in effect for rice. Cooperative marketing does not appear to be a very productive means of reducing price risks since the demands for most of these products are rather restrictive and highly inelastic.

If foodcrop production in the Coast is not as profitable as other alternatives, but production in this area is essential, water allocation and price policies which currently tend to subsidize sugar and rice production could be altered. Another course of action is to require a given percent of all land be allocated to foodcrop production. However, side effects from this course of action have been serious for other known cases; e.g., the coast of Peru.

Other factors which affect yields and total output are water control, land tenure and education of farmers in the use of known technology. All of these are technically feasible for solving by the Government of Guyana. USAID/Guyana may have a role to play in the latter by providing external funds for training extension and research personnel.

The development of foodcrop production in the North West, Intermediate Savannah, Central Mazaruni, Banim-Mora and Soesdyke-Linden (intermediate zone) regions appears to be constrained by two basic elements; the lack of cleared land with water control and people willing to assume the risks of producing highly perishable crops. Labor for producing foodcrops may be in critically short supply. Land resettlement projects may be necessary in these areas in order to attract sufficient manual and supervisory labor for increasing foodcrop production. Although transportation costs may not be extremely high, losses incurred in the marketing channel greatly reduce the profitability of producing and marketing perishable products. Government action may be needed to make improvements in packaging and transporting highly perishable products to reduce such product losses and increase total marketings.

Technical assistance could be directed at further identifying which foodcrops are potentially profitable for each of the geographic areas cited above. This identification should be based on an analyses of regional comparative advantages including production, transportation and marketing costs. The Dukhia thesis has the beginning of a satisfactory framework for determining regional advantages. The assessment report by Nathan's may also be useful in identifying alternatives. Until these comparative analyses are completed, however, any discussion of loans and grants of external funds for specific development projects would be immature.

Feasibility studies could possibly be undertaken to determine expected costs and returns from further water control management in the Coast, transportation systems work in general and land clearing operations in the intermediate zone. Profitable cropping systems including foodcrops

need further analysis. These are projects particularly well adapted to Inter-American Development Bank financing. Obviously, the need for adaptive research in production and marketing foodcrops and upgrading the Extension Service should be investigated. The USAID Mission in Guyana would be especially well adapted to undertake this worthy assignment. In addition to developing loan proposals for consideration by international banking institutions, valuable assistance from such AID supported institutions as the North Carolina State University Soil Fertility Laboratory and Tropical Soils Center, CIMMYT, CIAT, IRRI, and the International Potato Center could possibly be obtained by AID/Guyana at little marginal cost to the AID Mission or to Guyana.

APPENDIX TABLE 1  
INTERREGIONAL TRADE FLOWS - CABBAGE\*

Shipped From	To Region	Amount Shipped (pounds)
Coastal	Waini	6,760
	North West	12,035
	Pomeroon	15,320
	Coastal	823,202
	Aliki-Makouria- Kurupukari	19,714
	Soesdyke-Linden	20,083
	Banin-Mara-Maicony	14,703
	Intermediate Savannah	7,661
Upper Mazaruni	Upper Mazaruni	12,149
Central Mazaruni	Central Mazaruni	6,074
Pakaraima	Pakaraima	11,646
Kanuku-Kuyuwini	Kanuku-Kuyuwini	6,987

\* Source: Table 4:13(b) in John Dukhia, Regional Agricultural Planning in Guyana: M. S. Thesis, University of Guelph, 1973.

APPENDIX TABLE 2  
INTERREGIONAL TRADE FLOWS - BLACK-EYE PEAS\*

Shipped From	To Region	Amount Shipped (pounds)
Central Mazaruni	North West	55,790
	Coastal	2,097,223
	Upper Mazaruni	56,319
	Central Mazaruni	28,159
Soesdyke-Linden	Waini	31,030
	Pqmeroon	71,020
	Coastal	1,718,751
	Aliki-Makouria- Kurupukari	91,385
	Soesdyke-Linden	93,095
	Banin-Mara-Maicony	68,160
	Intermediate Savannah	35,512
Pakaraima	Pakaraima	53,988
Kanuku-Kuyuwini	Kanuku-Kuyuwini	32,391

\*Source: Table 4:13(e) in John Dukhia, Regional Agricultural Planning in Guyana: M. S. Thesis, University of Guelph, 1973.

APPENDIX TABLE 3  
INTERREGIONAL TRADE FLOWS - CASSAVA\*

Shipped From	To Region	Amount Shipped (pounds)
Coastal	Waini	99,813
	North West	179,461
	Pomeroon	228,448
	Coastal	1,274,760
	Aliki-Makouria- Kurupukari	293,957
	Banin-Mara-Maicony	219,250
	Intermediate Savannah	114,233
Upper Mazaruni	Upper Mazaruni	181,161
Central Mazaruni	Central Mazaruni	90,580
Soesdyke-Linden	Soesdyke-Linden	299,458
Pakaraima	Pakaraima	173,662
Kanuku-Kuyuwini	Kanuku-Kuyuwini	104,193

\* Source: Table 4:13(f) in John Dukhia, Regional Agricultural Planning in Guyana; M. S. Thesis, University of Guelph, 1973.

APPENDIX TABLE 4  
INTERREGIONAL TRADE FLOWS - PEANUTS\*

Shipped From	To Region	Amount Shipped (pounds)
Central Mazaruni	North West	13,488
	Pomeroon	689
	Coastal	922,586
	Upper Mazaruni	13,616
	Central Mazaruni	6,808
Soesdyke-Linden	Wajni	7,502
Pakaraima	Pakaraima	13,052
Kanuku-Kuyuwini	Pomeroon	16,480
	Aliki-Makouria-	
	Kurupukari	22,094
	Soesdyke-Linden	22,507
	Banin-Mara-Maicony	16,479
	Intermediate Savannah	8,585
	Kanuku-Kuyuwini	7,831

\*Source: Table 4:13(d) in John Dukhia, Regional Agricultural Planning in Guyana: M. S. Thesis, University of Guelph, 1973.

APPENDIX TABLE 5  
INTERREGIONAL TRADE FLOWS - PLANTAINS\*

Shipped From	To Region	Amount Shipped (pounds)
Coastal	Waini	450,751
	North West	810,435
	Pomeroon	1,031,657
	Coastal	55,543,200
	Aliki-Makouria- Kurupukari	1,327,490
	Wapin-Mara-Maicony Intermediate Savannah	990,118 515,868
Upper Mazaruni	Upper Mazaruni	818,108
Central Mazaruni	Central Mazaruni	405,054
Soesdyke-Linden	Soesdyke-Linden	1,352,334
Pakaraima	Pakaraima	784,245
Kanuku-Kuyuwini	Kanuku-Kuyuwini	470,531

\* Source: Table 4:13(g) in John Dukhia, Regional Agricultural Planning in Guyana: M. S. Thesis, University of Guelph, 1973.

APPENDIX TABLE 6  
INTERREGIONAL TRADE FLOWS - PROVISIONS\*

Shipped From	To Region	Amount Shipped (pounds)
Pomeroon	Pomeroon	914,423
Coastal	Waini	399,529
	North West	718,340
	Coastal	49,132,840
	Aliki-Makouria- Kurupukari	1,176,638
	Banin-Mara-Maicony Intermediate Savannah	877,605 457,246
Upper Mazaruni	Upper Mazaruni	725,141
Central Mazaruni	Central Mazaruni	362,511
Soesdyke-Linden	Soesdyke-Linden	1,198,659
Pakaraima	Pakaraima	695,126
Kanuku-Kuyuwini	Kanuku-Kuyuwini	417,062

\* Source: Table 4:13(h) in John Dukhia, Regional Agricultural Planning in Guyana: M. S. Thesis, University of Guelph, 1973.