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NUTRITIONAL GUIDELINES FOR
GUYANA'S AGRICULTURAL PLAN

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TABLE OF CONTENTS

	<u>Page</u>
ACRONYMS AND SPECIALIZED TERMS	i
EXECUTIVE SUMMARY	ii
I. INTRODUCTION	1
A. Purpose of the Report and Consultation	1
B. Summary of Tasks Accomplished	1
C. Comment on Data Used in this Report	2
II. BACKGROUND INFORMATION	4
A. Policy and Institutional Framework	4
1. General Development Plans	4
2. Food and Nutritional Policy Planning	4
3. Current Policy Context	6
B. On-Going Programs	7
1. Applied Nutrition Program	7
2. USAID-funded CEREX Weaning Food Project	7
3. The World Food Programme	9
C. Population Characteristics	9
III. NATIONAL NUTRITION SITUATION	12
A. Principal Food Varieties and Food Culture	12
1. Food Habits	12
2. Commercial Sector	13
B. Estimated Food Balances	19
C. Nutritional Problems	22
1. Adequacy of the Data	22
2. Past Trends and the Current Situation	22
IV. RECOMMENDATIONS	26
A. General Recommendations	26
B. Specific Recommendations	27
1. Increase Legume Production	27
2. Groundnut Production	30
3. Increase Production of Pond and Other Freshwater Fish	30
4. Cautious Approach to Investments in Kitchen Gardens	32
5. Increase Production of Feedgrains	32
6. Education and Public Health Recommendations	37

ACRONYMS AND SPECIALIZED TERMS

- Amerindians - Persons of indigenous American Indian descent, as opposed to persons of East Indian descent.
- CARICOM - Caribbean Common Market
- CFNI - Caribbean Food and Nutrition Institute (in Jamaica)
- GOG - Government of Guyana
- Ground provisions - Staple food crops such as cassava, sweet potato, yam, eddoe, tania, plantain.
- GUYSUCO - Guyana Sugar Corporation
- NFNC - National Food and Nutrition Council
- PAHO - Pan American Health Organization
- Paw-paw - Papaya
- "roti" - Unleavened bread
- UNICEF - United Nations International Children's Fund (now called United Nations Children's Fund)
- WFP - World Food Program (of the United Nations)

EXECUTIVE SUMMARY

The nutrition situation in Guyana is quite serious. It will be even more serious as the effects of wheat, split peas and other foodstuff import restrictions are felt throughout the country and especially in the urban areas. Malnutrition is particularly acute among the most vulnerable groups: weaning age infants, pre-schoolers, pregnant and lactating women. Anecdotal data suggest that undernutrition is common among adults as well.

The latest reliable nutrition survey was conducted by the Caribbean Food and Nutrition Institute in 1971. In the table below, the degrees of malnutrition found at that time are compared with similar data from neighboring countries.

TABLE
PREVALANCE OF MALNUTRITION IN YOUNG CHILDREN
(UNDER FIVE YEARS) IN GUYANA (1971) AND IN NEIGHBORING COUNTRIES
(GOMEZ CLASSIFICATION)

	Guyana (1)	Colombia (2)	El Salvador (2)	Chile (2)
Normal	39%	33.4%	25.5%	85.1%
Grade I (light)	43	45.6	48.5	11.9
Grade II (moderate)	16	19.3	22.9	2.5
Grade III (severe)	1.7	1.7	3.1	1.5

Sources: (1) Pan American Health Organization, The National Food and Nutrition Survey of Guyana, Washington, 1976.

(2) UNICEF, Situacion de la Infancia en America Latina y El Caribe, New York, 1977.

The survey also documented that malnutrition is more severe in rural areas where "22% more infants and young children under five years are in Gomez II and III than in urban areas."

The general nutrition situation seems to have changed little over the past decade. According to FAO food balance sheets, calories and protein per capita availability has increased only slightly in the past decade.

There is some evidence that rural families' nutritional status may have improved during the decade relative to urban families. Rural families are more likely to have kitchen gardens and to produce from their fields a larger portion of their food needs. This makes them less susceptible to rising costs of commercially marketed foods. Moreover, the cessation of wheat flour imports will impact greater in urban families than in rural families. Prior to the wheat embargo, rice was the most important staple food in rural areas while wheat products were more important in the cities.

However, the nutrition situation in general has worsened or remained the same during the past decade. Food prices, affected by inflation, have risen faster than wages. Shortages of staples are common. With import restrictions, pressures on the supplies of alternative staples have pushed those prices even higher.

From December 1981 to July 1982, the price of cassava, a major substitute for wheat, rose from 65-70¢ to \$2.00 per pound. In the same period, plantain prices rose from 55-75¢ to \$2.00 per pound. Wheat flour is essentially unavailable even on the black market. Rice has more than doubled in price. Eggs at \$7.20 per dozen and chicken at \$5.50 per pound are clearly out of the reach of the poor.

Even though farmers may be insulated somewhat from these price increases, their dependence on commercial production inputs will affect their incomes and willingness and ability to produce for the market.

Summary of Recommendations

There are several opportunities for improving nutritional status or preventing its further decline through specific agricultural policies. The highest priority among these policy changes ought to be the production of low cost high quality vegetable protein sources and grains which provide both proteins and calories, and tubers and plantains.

This first priority can be met through increased production for calories of legumes such as black-eyed peas, grains such as rice and corn, and tubers such as cassava, eddoes, and yams. All of these crops are now or have been produced in Guyana.

This nutrition-oriented study has not identified the specific bottlenecks to greater production of these food crops. Other consultants have analyzed these constraints.* Certainly rice has been studied sufficiently. Soybeans has been studied extensively in Guyana and is a legume of excellent quality and quantity protein. It is not usually consumed directly in the Western diet. It is certainly alien to the Guyanese diet.

Investments in legume production should focus on legumes for direct human consumption and not just on soy beans whose principal justification is for animal feed or for extensive processing for human foods such as Cerex.

A second priority should be the production of pond fish as a source of low cost animal protein. Investments for production are relatively low, consumer acceptance is good, but marketing beyond the immediate area is difficult because of the lack of roads, refrigeration, and ice.

A third priority should be to provide animal protein sources at reasonable prices for low income families. As other studies have indicated, the livestock industry in Guyana is imperiled and the poultry industry is facing extinction because of a lack of animal feed. These feeds have in

* Michael S. Hanrahan

the past depended on imported ingredients. The studies point out that some of the ingredients could be produced in Guyana; e.g. corn, cassava, rice bran, and soybeans (with careful management).

Even though adults can subsist on a diet of rice and beans, infants and young children need more complete proteins found in animal foods for normal growth. Red meats, particularly, are excellent sources of iron, essential to prevent iron deficiency anemia. Dark green leafy vegetables may be rich in iron, but are not easily digested by young children.

Kitchen gardens have been suggested by some as an intervention which would address important nutrition problems in Guyana. Kitchen gardens in Guyana and elsewhere do not produce the type of crops which provide adequate protein or calories. Dried legumes, rice, corn, wheat and other grains are and will continue to be the major sources of proteins and calories in the Guyana diet. These crops cannot be grown economically in kitchen gardens.

Lettuce and other truck garden crops which can be grown in kitchen gardens are abundant in Guyana and the people do not need incentives or education to grow them.

Kitchen garden campaigns can be distractions from addressing more basic food adequacy problems without providing the nutrients - proteins and calories - which are in greatest shortage.

These recommendations generally coincide with the GOG agricultural plan as described in the Inter-American Development Bank's Project Report: Guyana Agricultural Sector Loan, July 10, 1981. The only exception might be that the agricultural plan might not give the same emphasis to legumes for direct human consumption as is stressed in this report.

I. INTRODUCTION

A. Purpose of the Report and Consultation

The most important purpose of the consultation and this resulting report has been to describe the nutrition situation in Guyana and to identify agricultural interventions which would have particularly positive nutrition effects. These policies have been selected as appropriate to the cultural, social and economic constraints found in Guyana today. The report, however, does not attempt to address all nutrition problems in Guyana today. For example, obesity and hypertension are serious problems among the black urban population. As has been found in the United States, hypertension can be controlled through public health measures and education. Obesity arises from cultural conditions and may be addressed through long term education and motivation programs.

In addition, the consultation was to have trained a counterpart to monitor the policies of the Ministry of Agriculture and other public bodies for their potential impacts on nutritional status in Guyana.

Finally, the consultation was to have provided technical assistance to the Bureau of Census and the Statistic Bureau's methodology and survey instrument for the investigation of household income and expenditures.

B. Summary of Tasks Accomplished

The consultant, Mrs. Julia Nolan Chryst, was in Guyana from April 19 to May 17, 1982. During this time, she reviewed written documentation about the nutrition and food situation and met with numerous government and private sector officials knowledgeable about the food and nutrition situation.

In addition, the consultant conducted open-ended interviews with more than 15 low income rural and urban families. These interviews provided insights that assisted in the interpretation of statistical data such as

the 1971 nutrition survey, the 1981 nutrition survey, and other reports. Finally, the consultant met with planners of the Household Income and Expenditure Survey. During this meeting, the consultant suggested some approaches to interviewing that would yield the most useful data for nutrition and food policy planning.

In addition, the consultant reviewed published data and other consultants' reports about food and nutrition in Guyana.

This final report, based in part on the consultant's findings, was prepared by Thomas E. Cook, Food and Nutrition Analyst, supported by Patricia S. McPhelim and Frank L. Turner of Checchi and Company.

C. Comment on Data Used in this Report

Recent nutrition information was lacking in Guyana when this report was written. During the summer of 1982, the national nutrition survey was being tabulated and its results will go far in bringing up to date the study conducted in 1971. Similarly the consumption and expenditure data were 10 years old.

Agricultural production data from government sources are thought to be reasonably reliable and their use in the food balance sheets suggests that these documents are useful broad indicators of the availability of foods. The 1980 food balance sheet provided to the consultant, however, must be used with great caution in comparison with previous compilations from FAO. The 1980 sheet did not include all major foods nor does it include allocations for seed and waste. The latter category in Guyana may account for as much as 20% of the harvested supply for some foods.

Recommendations focussed on the increased production of legumes for direct human consumption. The consultant was unable to find any studies which analyzed the potentials and constraints for production of these specific food crops. Before any large investments are made in these crops, the literature in Guyana should be reviewed thoroughly to determine if

some institution has already answered many of the questions that today seem to be bottlenecks to greater production.

A general discussion of the constraints to agricultural production is found in another consultant report prepared under this same contract. Michael S. Hanrahan made specific recommendations that cover production of many food crops, including those which would have the most impact on the nutritional status of the population.*

With the new nutrition survey and the new consumption and expenditure survey in hand, officials of the National Food and Nutrition Council will be able to assess more accurately the nutritional consequences of proposed government policies and to recommend policies which will directly address nutrition issues. To be sure it would be useful to have many more studies and more reliable data about food habits, prices, production, etc. However, a judicious use of existing information combined with forceful advocacy will enable nutrition planners to bring their point of view to the attention of policy makers.

* Michael S. Hanrahan, Expanded Production of Foodcrops -- Guyana
Guyana Agricultural Sector Planning Project, Checchi and Company,
Washington, D. C., July 1982.

II. BACKGROUND INFORMATION

A. Policy and Institutional Framework

1. General Development Plans

The agriculture sector's development plan aims at meeting the following objectives:

- "Reduction of unemployment
- Increase the production of corn, legumes, fluid milk, vegetable oil, cassava, and some vegetables
- Increase foreign exchange generation through increases in the production of sugar and rice
- Improvement of nutrition levels of the people and variety of consumption
- Develop the processing of cassava, oil palm, pineapple, citrus, cashew, vegetables and cotton
- Achieve an average income per farm household of no less than G\$6000 per annum
- Continue the education of farmers and of the nation as a whole as to the central importance and dignity of agriculture as an occupation." *

According to nutrition advocates in Guyana, similar objectives had been written in the past without having much impact on the nutritional status of the low income families. Agricultural, health and nutrition programs tended to be carried out in isolation rather than through inter-ministerial collaboration.

2. Food and Nutrition Policy Planning

In response to this, the National Food and Nutrition Council (NFNC) was formed. The NFNC is part of the State Planning Secretariat and is directly linked with the government central planning staff.

* Inter-American Development Bank, Project Report: Guyana Agricultural Sector Loan (GY 0023) July 10, 1981.

The Council is comprised of representatives of the Ministries of Health, Agriculture, Education, Marketing and Trade and government food processing and research organizations as well as representatives of consumers. The consultant noted that recently, Council meetings have been attended by lower level functionaries from each of these organizations rather than by decision-makers. This has tended to delay decisions and to reduce the stature and authority of the Council.

Despite the difficulties inherent in all inter-ministerial organizations, the NFNC represents an important initiative by the Government of Guyana to address the nutrition and food problems of the country.

The NFNC is part of a regional effort at rationalizing food and nutrition policies throughout the Caribbean. Since 1974, the Caribbean Food and Nutrition Institute (CFNI) has been encouraging countries to develop national food and nutrition policies which recognized the inter-ministerial and inter-disciplinary character of the nutrition problem. In addition, CFNI has worked with CARICOM in the development of a regional food and nutrition policy.

The document which the consultant reviewed did not stress one of the most important elements of a regional strategy for the Caribbean area. Inter-regional trade did not receive the emphasis that it would appear to deserve. Given the different agronomic factors in Guyana in comparison with the rest of the CARICOM members, it would seem that Guyana and the other countries might have complementary comparative advantages in food production. Guyana has extensive, sparsely populated land, well suited to the production of livestock, some feedgrains, and legumes. The other island members have scarce land resources, but greater capital availability, enabling them to undertake some of the agro-business activities difficult to sustain in Guyana (cassava processing and feed formulating plants are either shut down or only partially operational in Guyana).

3. Current Policy Context

The precarious financial and economic condition of Guyana has had profound repercussions on the food and nutrition situation in the country. Because of the lack of foreign exchange, food and feed imports are being curtailed. Wheat flour was banned several years ago. Since the Spring of 1982 wheat grain importation has also been banned. In response, the retail price of wheat flour has risen from 65¢ to \$9.00 per pound. Split peas, another staple, especially for the rural population of East Indian origin, have also been banned from importation. Balanced animal feeds are scarce and expensive. Spare parts for the largely mechanized agricultural sector are not readily available.

Since in earlier years about 20% of dietary calories were provided through wheat products, the consumers have had to switch to other foods to replace wheat. Rice is the least expensive good source of protein that is a substitute for wheat. Between December 1981 and July 1982 prices increased from G\$2.52 to G\$3.92-\$5.50 per gallon. Cassava, plantains and eddoes have little protein, but they contain ample calories and have the bulk to give a feeling of having eaten well. In the same seven months, these staples which are not price controlled like rice have increased 300-350%.

Rice is the most important staple for domestic consumption, providing about one-third of all calories and about 26% of all protein for the diet. Over the past ten years, overall production and internal consumption have been increasing, always allowing for sufficient amounts for export. The rice crop for the coming year is being endangered by a lack of fertilizers and other farm inputs. If there is a substantial drop in production, the government may shift supplies from the domestic consumption sector to supplies for export since this is a major earner of foreign exchange. Should this occur, a major source of low cost protein and calories would be denied to a large sector of the population.

Until the foreign exchange availability is increased, imports of food, feed and spare parts will continue to be curtailed. Agricultural production

except for home consumption is likely to be very low. The government policy of self-reliance and self-sufficiency in food is getting an unintentional boost, but at a high cost.

As the population shifts from animal sources of proteins and calories to legumes to grains to roots and tubers, one finds an increasing number of cases of severe malnutrition especially among infants and young children. The protein from roots and tubers is of lower quality and there is a lower percentage of protein in the food intake. Infants and young children need to eat foods which are dense in proteins and calories because their small and immature stomachs cannot take in enough bulky food to extract sufficient protein for growth and repair of their bodies.

B. On-Going Programs

1. Applied Nutrition Program

UNICEF has funded a modest applied nutrition program in a few regions of the country. Total funding for four years will not exceed US\$250,000. It is aimed at (a) increased production of food crops, (b) food preservation and preparation and (c) nutrition education.

The Government of Guyana also has an applied nutrition program that operates through the Agricultural Extension service of the Ministry of Agriculture.

From the consultant's brief contact with these programs it was not possible to assess the extent to which their resources would satisfy the need for assistance in small farmer development of food crops. Both projects are considered to be "pilot projects."

2. USAID-funded CEREX Weaning Food Project

This AID-sponsored project aims at demonstrating how local resources can be used to develop an acceptable low cost weaning food that meets nutrition needs of this vulnerable population segment. The project to produce CEREX began in 1978 and is now in operation, with distribution

throughout the country. A household evaluation was conducted in June 1981. A preliminary analysis indicates that the product is being consumed by a large portion of the population of "target" children. However, anecdotal information on the situation in recent months indicates that CEREX is now being consumed by all members of the family as a partial replacement for wheat flour which is no longer available in Guyana.

The formula for CEREX is comprised of local and internationally procured foods and chemicals. With the exception of the milk powder and the minerals and vitamin premix, the ingredients are eventually to be produced in Guyana. At the present time, all of the ingredients except rice and sugar are being supplied gratis by AID.

TABLE
INGREDIENTS FOR THE CEREX WEANING FOOD

<u>Current Formula</u>	<u>Percent</u>	<u>Source</u>
Rice	15.6	Local
Sugar	8.1	Local
Corn Meal	37.4	PL 480
Soy Bean Flour	18.9	PL 480
Milk Powder	9.5	PL 480
Soy Bean Oil	7.3	PL 480
Mineral Premix	3.1	USAID
Vitamins	.1	USAID

Corn production is declining in Guyana and the soy production project has not been successful to date. Rice can substitute for the lack of corn, but the lower protein content will have to be compensated for by adding more milk powder or legumes. The rich corn taste which is desirable in Guyana could be replaced by plantain flour. Coconut oil can be a substitute for soya oil although it is a highly saturated fat.

CEREX is being produced by the Guyana Pharmaceutical Corporation, a government owned organization. The plant has a capacity of 80 metric tons per month. During 1981, it produced an average of 32 metric tons per month. While this may be sufficient for the narrow target group of

weaning age youngsters, it is only a fraction of the domestic demand for cereals. On the average, 8,000 metric tons of rice and 3,000 metric tons of wheat are consumed monthly in Guyana.

With the shortage of wheat flour, CEREX which was once being consumed by an impressive proportion of the target group is now being shared among all family members, diluting its nutritional impact.*

3. The World Food Programme

WFP has three projects in Guyana. The first supports new settlements in the Upper Berbice area. It is a three-year project, funded for US\$1,000,000. The second project is an experimental feeding program in selected pre-schools. It was approved in 1982 and funded for US\$3.4 million for five years. The third project is a dairy development pilot program which has been in operation since 1977, for a total cost of US\$1,200,000.

C. Population Characteristics

The demographic data base in Guyana is somewhat incomplete. The general trend seems to be a slow growth due to a high out-migration. The 1980 population estimates were released in May 1982.

TABLE 11-C
POPULATION ESTIMATES BY AGE GROUP
GUYANA 1980

<u>Age</u>	<u>Population</u>
0 - 1 year	23,000
1 - 3 years	23,600
4 - 6	71,135
7 - 9	72,952
10 - 14	102,538
15 - 18	111,248
19 - 39	260,616
40 - 49	60,870
50 - 59	48,946
60 +	<u>18,095</u>
Total	<u>793,000</u>

Source: Provided to the Consultant by the National Food and Nutrition Council

* See footnote next page.

These figures are in conflict with the United Nations' estimates which would put the 1980 population at about 884,000. This disparity in estimates is probably based on the failure of the UN sources to take into account the slowdown in the growth rate. In 1971, the population was growing at about 1.8% annually; by 1981 the Ministry of Economic Planning's Statistical Bureau estimated that the growth rate had slowed to about .3% annually.

Data about the rural and urban differences are not available to this consultant. However, this distinction is not wholly necessary since nearly 90% of the population is concentrated in the towns and along the coastal highways. There is a very small portion of the population living in isolated rural communities typical of other South American countries. Health services, for example, are accessible to nearly the entire population as contrasted to countries in Central America where only 30-40% of the population may be within easy reach of a health center or hospital.

Ethnic differences are important in food and nutrition policy since each group has distinct food preferences. In urban areas, about 62% of the urban population is of African descent and 38% are of East Indian extraction. In the rural areas the proportions are reversed. The Amerindians - the indigenous groups - mostly live in the interior and comprise 5-8% of the population.

The population density in Guyana is quite low; there are large areas of the country that are virtually uninhabited. Some of this land, such as the Intermediate Savannah, seems especially promising for food crop production. However, the government would have to provide a large investment in infrastructure, which seems unlikely for the foreseeable future because of budgetary problems.

* Previous page footnote.

The information about this project has been taken from the following reports: Sandra Callier, "AID Project No. 504-0073 Weaning Food Development, An Assessment of Progress to Date," Sept 28-Oct 9, 1981, Georgetown; A.A. Ackels, "Assessment of the Current Status of USAID Project No. 504-0073," Oct 8, 1981; Cesar Amorin and others, "Indigenous Commodities for Guyana Weaning Food Development," March 1982.

The slow population growth of Guyana will help the nutrition situation in the sense that there will be fewer mouths to feed. However, the out-migration from country - if it follows the pattern of other countries in the region - will reduce the economically active population of the young and vigorous.

III. NATIONAL NUTRITION SITUATION

A. Principal Food Varieties and Food Culture

1. Food Habits

Prior to the recent food crisis sparked by the lack of foreign exchange, the diet of the typical Guyanese was based on cereals. Rice has been and still is the most important staple, with the Guyanese per capita consumption only exceeded in South America by its neighbor, Surinam. Wheat - all of which has been imported - has been the second most important. Wheat products are generally unavailable in Guyana today.

Plantains and cassava are also staples in the diet. Fish, meat and poultry used to be important sources of protein. Today, all but fish are expensive and out of the reach of most families.

The most vulnerable group nutritionally in the population are the infants up to 2-3 years of age. With the easy availability of powdered milk and cereal-based infant foods, both urban and rural mothers wean their infants at an early age. In a survey taken in June 1981, 60% of the infants in the cities were no longer breast fed at their fourth month, while in the countryside about 56% were off the breast at this time.

Semi-solid foods are gradually introduced and about 65% of the infants at their fifth month are receiving these foods. This average is higher in the cities and lower in the rural areas.

The scarcity of milk, wheat-based infant foods, CEREX, meat and eggs, will cause the quality of these early solid foods to deteriorate. Higher infant mortality rates can be expected in the near term unless mothers change their breastfeeding patterns and keep the infants nursing well into their second year.

Ethnic differences contribute to the complexity of food consumption patterns. The East Indian families are more likely to have eaten split peas

(the importation has now been prohibited) than would African families; and the Africans are more likely to be eating plantains, yams, eddoes and cassava. Egg plant and shrimp are more popular with the East Indians while Africans consume greater quantities of beef (which is taboo for Hindu families) and more evaporated milk and biscuits.

Wheat products seems to be eaten in equal quantities by each group, although the East Indians would eat "roti" while the Africans would eat white bread.

The Hindu and Moslem religions of the East Indians account for some of the most tenacious food habits. Beef and pork taboos are common in nearly all the rural East Indian homes. Scaleless fish are also taboo.

2. Commercial Sector

Guyana is a commercialized country. There would appear to be comparatively few subsistence farmers such as are found in rural areas of other South American countries. Most of the food consumed has been purchased. In the consumption and expenditure survey in 1970, it was found that 98% of all the pulses and nuts were purchased. One of the most important sources of calories, -plantains were one of the products which were produced mostly at home. Even here, 83% of the consumption was purchased, and for yams the proportion was 79%. The food with lowest rate of purchasing was paw-paws at 64%.

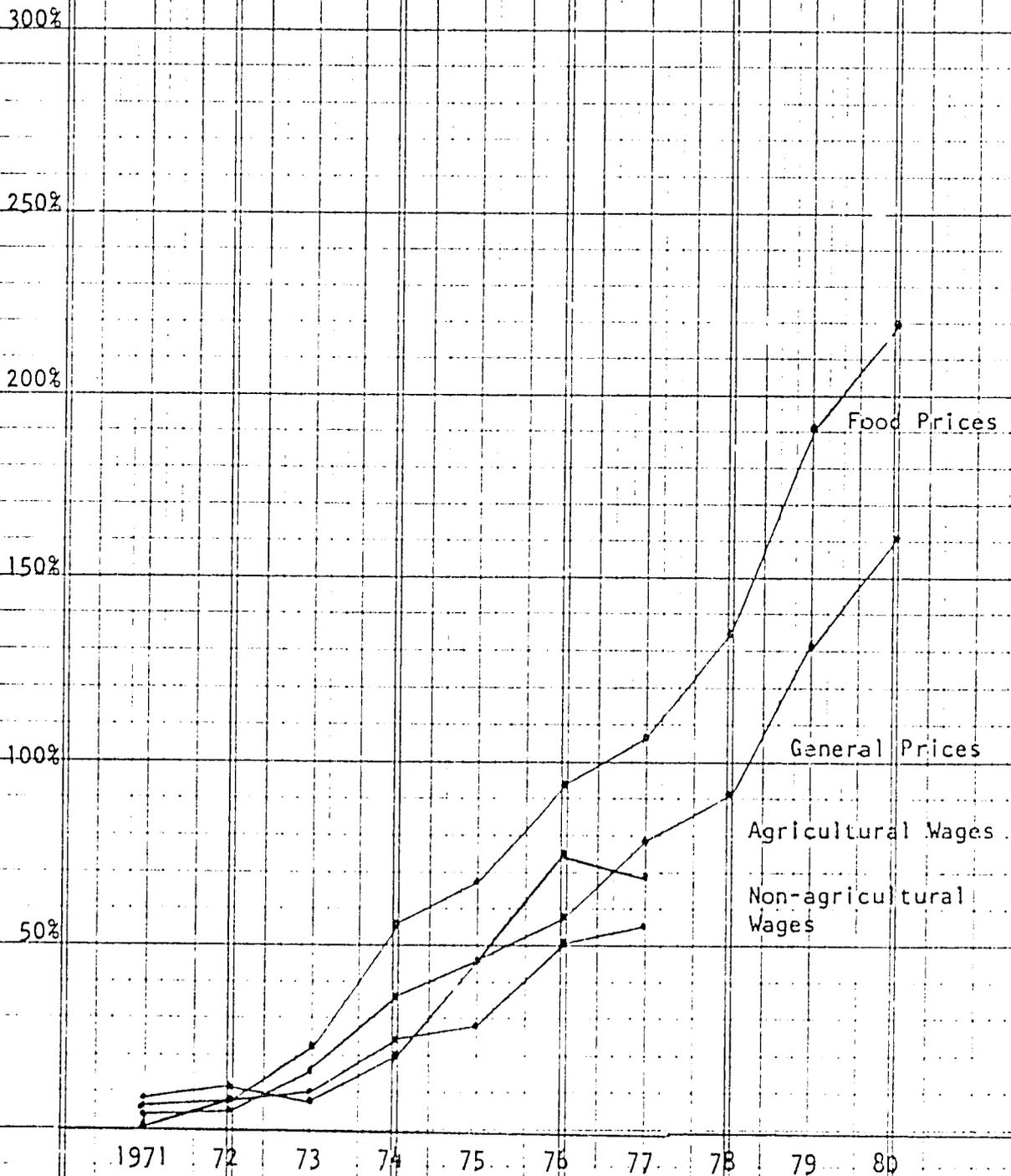
With the commercial sector playing such an important role in the distribution of food, all families, rural and urban alike, are vulnerable to income-price squeezes. During the period from 1970 to 1977, the families were under great pressure to make their food budget stretch even further.

As the following figure shows, food prices in the period 1970-1977 rose faster than general prices and considerably faster than wages.

Figure III-A-2

COMPARISON OF WAGE AND FOOD PRICE INCREASES
1971-1977

(percentage increase over 1970)



Source: International Labor Organization. Yearbook of Labor Statistics, Geneva, 1980.

As prices rise, food selection tends to change. Patterns of change in the past may suggest what will happen as the food prices rise with the scarcity imposed by the embargoes on importations of some basic foodstuffs. Two tables are reproduced on the next two pages from earlier studies that may indicate the direction of food habit changes over the short term.

Wheat flour is now unavailable or only can be purchased at more than 10 times the price of six months ago. From the tables, one might expect that rice consumption would increase the greatest in response followed by ground provisions. However, rice has increased in price as well, both in government controlled stores and in the free market. Consumers will be switching to ground provisions and plantains. White potatoes and wheat flour are no longer available in Guyana.

Pressure will be building on prices and supplies of ground provisions and plantains, both sources of calories and bulk rather than high quality proteins, vitamins and minerals. From one report, it has been learned that the prices for cassava have increased about 300% between January and July 1982, while plantains have increased about 350%.

Table III-A-2-a

FOODCROPS AND RELATED COMMODITIES: ASSUMED PRICE
ELASTICITIES AND CROSS-ELASTICITIES OF DEMAND

Commodities subject to 1-percent change in price	Elasticities measuring change in purchases of specified commodities						
	Oilcrops	Provisions	Vegetables	Fruit	Pulses & nuts	Rice	Wheat flour
Oilcrops	-.62	--	--	--	--	--	--
Provisions	--	-.40	.03	--	--	.05	.02
Vegetables	--	.03	-.80	.05	.14	--	--
Fruit	--	--	.05	-.90	--	--	--
Pulses & nuts ...	--	--	.14	--	-.75	--	--
Rice	--	.04	--	--	--	-.50	.02
Wheat flour	--	0	--	--	--	.02	-.15

Source: Guyana's Foodcrop System: An Analysis for Development Planning, Washington, D.C.
Robert R. Nathan Inc. 1974.

Table III-A-2-b

PRICE AND INCOME ELASTICITIES FOR
SELECTED FOODCROPS IN GUYANA

Commodity whose demand is affected	Income elas- ticity	Price elas- ticity <u>a/</u>	Cross-elasticities	
			Substitute commodity	With regard to price of substitute <u>b</u>
Ground provisions..	.27	-.55	Plantains	.10
			White potatoes	.04
			Rice	.04
			Wheat	.01
Plantains.....	.27	-.55	Ground provisions	.10
			White potatoes	.04
			Rice	.04
Vegetables.....	.45	-.80	Ground provisions	.03
			Plantains	.03
			Split peas	.07
			Other pulses	.07
			Fruit	.05
			White potatoes	.03
Split peas.....	.37	-.75	Vegetables	.15
			Other pulses	.07
Other pulses.....	.37	-.75	Vegetables	.12
			Split peas	.12
Fruit.....	.70	-.90	Vegetables	.05
			Sugar	.05
White potatoes....	.27	-.40	Ground provisions	.03
			Plantains	.03
			Rice	.02
			Wheat	.01
Wheat flour.....	.10	-.15	Ground provisions	.01
			Rice	.02
Vegetable oils....	.42	-.62	None in foodcrops	--
Rice.....	.30	-.50	Ground provisions	.05
			Plantains	.05
			Wheat flour	.02
			White potatoes	.05
Sugar.....	.33	-.50	Fruit	.07

a/ Any coefficient in this column expresses the influence of a change in the price of the commodity upon consumer demand for that commodity. A negative coefficient expresses the percentage decrease in demand that will result, all else the same, from a 1.0 percent increase in price.

b/ Any coefficient in this column expresses the influence of a change in the price of the substitute commodity upon consumer demand for the original commodity.

Source: Guyana's Foodcrop System: An Analysis for Development Planning,
Washington, D.C. Robert R. Nathan Inc. 1974.

B. Estimated Food Balances

On average, Guyana has had sufficient food to supply its population with adequate amounts of calories and proteins...if there were perfect distribution among income and ethnic groups, between the rural and urban areas, and within the families themselves. There is, of course, imperfect distribution and thus there can be seen in Guyana the simultaneous public health problems of obesity and undernutrition.

Imperfect distribution exists in all countries, making the food balance sheets an analytical tool that must be used carefully. The food balances may be used to compare one country with another and to suggest the relative importance of different categories of foods. The balances are also useful in estimating the impact of dramatic changes in supply. It is for this latter purpose that they will be used in this report.

Over the past several months, the Government of Guyana has progressively restricted the importation of foods which many considered essential to their diet: wheat and all its by-products; vegetable oil, split peas, powdered milk, cheese, and baby food. White potatoes, tinned fish and meats, chocolate, and wheat flour had been prohibited several years before.

These restrictions are already having an important impact on the food habits and ultimately on the nutritional status of the Guyanese population. In the table which follows the food balance sheet for the period before the restrictions is compared with the projected balances after the decrees.

The food balance table shows a protein and calorie gap that can be filled by diverting the exports of some of the rice crop and by the increased production of some of the crops in which Guyana already has had experience such as plantains, black-eyed peas, and corn.

There are other gaps which will develop as the secondary results of other developments. For example, there is a prohibition on the importation of hatching eggs which will essentially paralyze the poultry industry.

Table III-B

FOOD BALANCE SHEET -- GUYANA

	1975 - 1977						1982		
	Domestic Supply (metric tons)	Kilo/ Year	Per Capita Supply				Food Gaps		
			Grams	Calories	Protein	Fat	Calories	Protein (grams)	
Grand Total				2,431	59.2	43.5			
Veg. Products				2,143	37.3	25.6			
Animal Products				288	21.9	17.9			
<u>Cereals</u>									
All Wheat*	34,841	43.1	117.0	430	12.3	1.3	430	12.3	
All Rice	67,688	83.7	229.2	834	16.5	1.4			
Other Cereals	1,057	2.1	7.9	21	.7	.2			
Roots & Tubers	19,557	24.2	66.3	58	.9	.1			
All Sugars	30,379	37.5	102.9	397	3.0	-			
Dry Peas*	3,861	4.8	13.1	45	2.9	.3	45	2.9	
Other Pulse/Leg.	271	.3	.9	3	.2	-			
All Nuts/Oil Seeds	2,571	3.1	8.7	13	.4	1.0			
All Veg.	9,547	11.9	32.3	10	.5	.1			
Plantains	12,745	15.8	43.2	34	.3	-			
Other Fruit	19,851	40.4	67.1	25	.3	.1			
Beef**	5,680	71.0	26.3	40	3.7	2.6	20	1.8	
Sheep	534	.6	1.8	2	.3	.1			
Pig**	2,135	2.7	7.2	15	.8	1.3	7.5	.4	
Chickens**	10,416	12.9	35.2	55	4.1	4.2	27.5	2.0	
Eggs**	3,930	4.9	13.3	17	1.3	1.1	8.5	.7	
Freshwater Fish	2,000	2.5	6.8	5	.7	.2			
Marine Fish	14,878	18.4	50.4	32	5.2	1.1			
Domestic Milk**	12,038	14.9	40.8	15	1.4	1.2	7.5	.4	
Import Milk & Cheese*	11,416	14.1	38.6	79	3.9	4.2	79	3.9	
Veg. Oils & Fats*	6,266	7.7	21.2	175	-	19.7			
Animal Fat & Oils	526	.6	1.4	12	-	.5			
Barley Malt, Beet	21,765	26.9	73.7	27	.2	-			
							Total	625	24.4

* Imports restricted

** Affected by import restrictions

Source: FAO data for 1975-77; food gaps in 1982 estimated by Thomas Cook.

Similarly, the importation of feed grains is restricted, further reducing the productivity of the poultry and livestock industries.

The table shows that current food policies will result in a gap of 625 calories or about 25% of the average daily requirements. A gap of about 38% of the average daily protein requirement would result from these food restrictions.

These figures must be used very cautiously for several reasons. In the first place, the 1975-77 production figures are lower in some categories such as plantains than is currently the case. Secondly, one can only roughly estimate the impact of the scarcity of feed grains on the supply of meat, milk and eggs. For purposes of illustration, the availability of beef, pigs, chickens, and eggs has been reduced by 50%; domestic milk production has been reduced by 30%. Thirdly, if prices increase sufficiently for some restricted products, contraband imports and a blackmarket will expand, alleviating the tight supply somewhat.

Nevertheless, the reduced supply of protein and calorie-rich foods will work its greatest hardship on low income urban families, those most exposed to the marketplace and vulnerable to scarcities. In addition, infants and young children whose needs for dense protein and calorie foods are especially great will suffer the most. Adults can subsist on rice, corn, plantains, cassava, some legumes, but infants - especially if they are not breastfed until 18 or 24 months - need eggs, meat, fish, cooking oil, and other food rich in essential nutrients. Abundant supplies of vegetables such as eggplant, lettuce, immature beans, and so forth, will not satisfy these needs.

Recommendations which will address these problems will be suggested in Section IV. Section III concludes with comments about the health and nutrition status in the country.

C. NUTRITIONAL PROBLEMS

1. Adequacy of the Data

Estimates of the nutritional status of the Guyanese population must be made with considerable caution because the data base is incomplete. The most recent reliable nutrition survey available was conducted in 1971 by the Caribbean Food and Nutrition Institute. A new nutrition survey has been completed, but the results are not available. Nutrition status reports on the infant and pre-school population are available through secondary sources for 1974-75, and 1976, but this is coverage of only about 25-30% of the under-five population. Finally, the latest consumption expenditure survey was conducted in 1970. A new survey is planned for the near future.

Not only is the data base out of date, but the rapidly changing food situation in Guyana makes use of even this data very difficult. As explained in Section III-B above, the restrictions on food imports may reduce by 25% the supply of available calories and by 30-40% the supply of protein. This would be the average nutrient gap; the deficit would be unequally distributed among urban and rural families, between the rich and the poor and among family members.

2. Past Trends and the Current Situation

Eleven years ago when the nutrition survey was conducted, the findings indicated that the nutritional status of the Guyanese population was certainly better than many Central and South American countries but not as good as many of the islands in the English-speaking Caribbean. The following table compares Guyana with South American countries and some Caribbean countries.

TABLE III-C-2-a

PREVALENCE OF MALNUTRITION IN YOUNG CHILDREN (UNDER 5 YEARS)
IN GUYANA AND NEIGHBORING COUNTRIES

(Gomez Classification)

	Normal	Grade I (light)	Grade II (moderate)	Grade III (severe)
Guyana (1971) ⁽¹⁾	39%	58%	16%	1.7%
Colombia ⁽²⁾	33.4	45.6	19.3	1.7
El Salvador ⁽²⁾	25.5	48.5	22.9	3.1
Chile ⁽²⁾	85.1	11.9	2.5	.5
Jamaica (1970) ⁽¹⁾	50.2	39.0	9.4	1.4
Trinidad & Tobago ⁽¹⁾	50.7	36.8	11.1	1.4
Barbados ⁽¹⁾	60.5	36.1	3.1	.3

Sources: (1) Miguel Gueri, "Childhood Malnutrition in the Caribbean,"
Bulletin Pan American Organization 15(2) 1981

(2) UNICEF, Situacion de la Infancia en America Latina y
El Caribe, New York 1977

Infant mortality is a good indicator of nutritional status. In some communities in Bolivia and Haiti, as many as 250 of every thousand infants die before their first birthday. In Guyana the recorded average is 50, while in Trinidad it is 25.6, in Barbados 28.3 and in Jamaica 15.0.

Another source of nutrition information has been weight for age measurements taken by the Ministry of Health.

These figures show the interesting pattern of increasing malnutrition as the child gets older. This type of pattern can usually be attributed to inadequate weaning practices and maldistribution of food in the home. If protein and calorie availability is low for the family in general, one might expect that malnutrition among these older infants will be even more severe.

TABLE III-C-2-b

PREVALENCE OF MALNUTRITION IN YOUNG CHILDREN IN GUYANA
1974-1976

Age in Months	% Normal			% Grade I			% Grades II and III		
	1974	1975	1976	1974	1975	1976	1974	1975	1976
0-11	68.1	70.3	71.6	24.2	23.6	22.9	7.5	6.1	5.5
12-23	41.0	44.4	47.5	40.4	41.8	40.9	18.6	13.8	11.6
24-59	35.0	38.3	38.6	45.9	43.7	44.8	19.1	18.0	16.6
0-59	53.7	53.5	55.0	33.5	34.5	34.3	12.8	12.0	10.7

Source: Nutrition Division, MOH.

In addition to these indicators of infant and child nutritional status, the 1971 survey found that a high proportion of all age groups in rural and urban areas were anemic. The study found that low dietary iron was associated with anemia, but some anemia was found in households with high iron intakes. This suggests that parasites may be an important cause of some of the anemia.

Most analysts feel that the nutritional status of the population improved during 1970's. However, the food shortages and high prices of the past six months will cause great hardship in many families.

A nutrition surveillance system, under these circumstances is particularly useful to assure that the social costs of food restriction and self reliance are not too high. A sensitive system will help the government and international agencies to reallocate, if necessary, the modest food programs now operating in Guyana.

IV. RECOMMENDATIONS

A. General Recommendations

The Government of Guyana has already recognized the importance of producing food for domestic consumption in its agricultural policy statements. The government has also made the conceptual link between domestic food production and the nutritional status of the population. However, for the past six months and for the foreseeable future the country will be undergoing a severe nutritional and food trauma. The shortage of foreign exchange has accelerated the implementation of the previous policy of increasing self-sufficiency in food production and animal feed. This crisis is also completing the change in food culture away from the colonial diet of beef, biscuit, and tinned fish toward foods more easily produced in a tropical country.

The recommendations which follow address the general problems of calorie and protein deficiencies. These recommendations concentrate on agricultural interventions, but they would be incomplete without including education and public health recommendations. Some of these recommendations may be redundant and statements of what has been policy and practice in Guyana for some time. They are mentioned here in order to underscore the multidisciplinary and multisectoral nature of food and nutrition policy.

There are two types of agricultural policy recommendations. The first type recommends support for the production of direct consumption foods. Included here are recommendations for increased production of legumes which are consumed directly rather than those which are processed. Another direct consumption recommendation is for the increased production of pond fish. A third recommendation in this category cautions government policy makers from spending precious time and energy on kitchen and school garden strategies.

The second type of recommendations relates to the production of animal protein.

Education and public health recommendations are directed toward improving the utilization of existing food resources: encouraging exclusive breastfeeding for the first four months of life and prolonged breastfeeding for 18-24 months; and secondly, combatting the high incidence of intestinal parasitism through a public health program of deworming of young children and adults.

B. Specific Recommendations

1. Increase Legume Production

With the restriction on the importation of split peas, there is a substantial reduction in the supply of protein from legume sources. Additional protein will have been lost from the reduced production of eggs, milk and livestock. This gap will be reviewed later.

In order to make up for the deficit caused by the absence of split peas in the market, it may be possible to produce black-eyed peas in sufficient quantities to offset the split pea shortage. This proposal ignores for the moment the unknown factor of consumer acceptability of a legume diet comprised almost entirely of black-eyed peas.

In the period 1975-77, Guyana on average imported 8,494,000 pounds of split peas per year. As of 1982, these imports have stopped. With the protein content of split peas and black-eyed peas being about the same, Guyana will need to produce an equivalent amount of black-eyed peas to meet the demand for legumes and to satisfy protein requirements.

In 1978 Guyana produced 3,200,000 pounds of black-eyed peas using about 5,333 acres with an average yield of about 600 pounds per acre. In order to produce an additional 8,500,000 pounds of black-eyed peas, an additional 14,166 acres will need to be placed into cultivation. To put this in perspective with the production of other crops, the 20,000 acres proposed for black-eyed pea production would be equivalent to the total acreage that small farmers now devote to cane production. It would represent about 5% of the currently 440,000 acres under production in the country.

The feasibility of this intervention will be based on many factors. Many of these have been discussed in non-crop specific terms in the report by Michael S. Hanrahan, Expanded Production of Foodcrops-- Guyana Agricultural Sector Planning Project (Checchi and Company 1982). Some of the issues that concern black-eyed pea production are the following:

The current yields per acre in Guyana have remained the same for the past twenty years. In the following table (Table IV-B) yields are shown from 1963-1973. Thereafter production increases five-fold, presumably through a policy of devoting more land to production. It is known that GUYSUCO, the government owned sugar producing firm, is setting aside a small portion of its cane-growing land for legume production. Increased planting rather than more efficient production probably accounts for increased production.

If the yields per acre increased on the average from 600 pounds to 1000 pounds per acre (which is about 60% of the yield of irrigated black-eyed pea production in California), then the land needed for pea production would be reduced to 11,694 acres, about double what is now being used for this crop.

These kinds of yields assume that there will be improved seeds available and that farmers will apply fungicides and other farm chemicals as needed. These inputs, unless special exceptions are made, may also be restricted from importation because of the lack of foreign exchange.

The policy of increasing production by increasing yields may make sense under other circumstances and in other countries, but today in Guyana the scarce commodity is foreign exchange and the abundant resource is arable uncultivated land. Therefore, the agricultural policy might best be directed at expanding the acreage in black-eyed peas.

Table IV-B

BLACKEYE PEA PRODUCTION AND YIELD PER ACRE (1960-1978)

Year	Area (acres)	Production (pounds)	Yield (pounds/acre)
1960	NA	NA	NA
1961	NA	NA	NA
1962	NA	NA	NA
1963	211	135,000	640
1964	412	246,500	598
1965	305	198,000	649
1966	345	178,000	516
1967	326	165,000	506
1968	305	175,000	574
1969	348	271,000	779
1970	400	340,000	850
1971	542	382,000	705
1972	560	400,000	714
1973	937	544,000	581
1974		1,800,000	
1975	---	2,200,000	---
1976	---	1,600,000	---
1977	---	2,400,000	---
1978	---	3,200,000	---

SOURCE: Ministry of Agriculture, Resource Development and Planning.

2. Groundnut Production

Groundnuts offer an attractive alternative source of vegetable protein, plus the additional benefits of being an excellent source of edible oils of which Guyana is also an importer. The presscake after oil extraction is a valuable animal feed. However, there is little information about the constraints to increased groundnut production in Guyana. This crop like other legumes deserves attention by the Ministry of Agriculture both for its food value for the domestic market and a source of import substitution.

3. Increase Production of Pond and Other Freshwater Fish

Freshwater fish represented only 12 percent of the total fish supply for domestic consumption in Guyana during the period 1975-77, the latest years for which there are figures. This is especially low considering that the country is interlaced with rivers and relies heavily on irrigation for crop production.

Marine and freshwater fish are acceptable foods in Guyana and are an important part of the diet. Consumption of fish exceeded by 62 percent during this period the per capita consumption level for chicken. A "Partial Food Balance Sheet for 1980," prepared by the National Food and Nutrition Council, shows that fish has an even more important role in the Guyana diet. In that year, there were 10 grams of beef available per capita compared with 36 grams of poultry and 62 grams per capita for fish. Between 1977 and 1980, beef production dropped by almost 50 percent while fish production stayed the same.

There seem to be few taboos against fish consumption except regarding "scale-less fish" -- presumably catfish and related species. Since the population is located for the most part close to the coast, the citizenry are accustomed to eating marine fish. There may be some objection to consuming smaller fish and fish with more bones than the large marine fish which can be cooked in the stews popular in the region.

The protein of fish and seafood is complete, that is, it requires no supplementation to be utilized completely by the body, unlike proteins from grains and legumes. The quantity of protein is equivalent to that found in equal portions of red meat and poultry. The energy value, however, is somewhat lower for most species. Usually, the lower the cost for the fish, the higher the fat content -- and hence the stronger the taste.

Nevertheless, there are some strong arguments for emphasizing freshwater fisheries. The capital investment is lower since boats will not be necessary. The land for the fisheries -- rice fields in fallow -- has a low opportunity cost. In fact, some specialists feel that soaking the clay-filled rice fields for several months will return them to a more cultivatable condition. The fish may be fed from a number of sources, including the droppings from poultry, food scraps, rice bran, and other refuse. While it may be preferable to give balanced foods, fry have been successfully raised to maturity on scraps.

Fish may also be raised in pens along rivers and streams, feeding on plankton sifting through the cages. This type of fish culture is not typical in Guyana and would require technical assistance.

A major investment for any type of fish culture would be a hatchery since many of the species most desirable for fish farming reproduce through spawning. The consultant was told that the government has built one hatchery for the production of tilapia fingerlings.

No data were available on the investment that would be required to produce a given quantity of freshwater fish for marketing. Using a very rough analysis, it would seem that fish culture would be a desirable alternative source of animal protein. At market prices before the import restriction, fish was a slightly lower cost per gram of protein compared with poultry, pork, and beef. To the extent that waste can be used as feed for fish, instead of feed grains, fish culture will represent a less expensive way of producing high quality protein than livestock since feedgrains must now be imported.

4. Cautious Approach to Investments in Kitchen Gardens

Throughout the rural area of Guyana and indeed in many urban neighborhoods, kitchen or patio gardens can be found. These produce an important part of the vegetables consumed in Guyana. The 1971 National Nutrition Survey reported that 45 percent of the rural households had kitchen gardens. The five principal vegetables grown are bora beans, okra, calalu (spinach), eggplant, and tomato.

These foods and others which are grown in kitchen gardens contribute very little to the protein and calorie supplies of the country. For example, to provide all the dried peas and beans that a family of six might eat in one year (according to the 1975-77 Food Balance Sheet) would require about 5,000 square feet of land (e.g., a plot 71 x 71 feet). Nor is it practical to produce rice in a kitchen garden because rice cultivation is better suited to large fields and mechanization.

Kitchen gardens do not produce enough proteins and calories to make any serious difference in the food balances of a country. Also, giving kitchen gardens a priority may become a distraction from addressing the real production issues that affect food supply more permanently.

The production of seed is an example. In order to have a successful kitchen garden program in a country, adequate supplies of high quality seeds are necessary. Two year old packets of commercial seeds from the U.S. or U.K. will not be useful. Fresh seeds annually are necessary. The same energy and funds that would go into procuring seeds for kitchen gardens might be better spent in getting seeds for improved legume production.

5. Increase Production of Feedgrains

The poultry and livestock industry is in serious trouble in Guyana. This has important nutrition implications because the food culture is oriented toward beef and chicken consumption.

Animal protein is essential for infants and young children. Since it is the custom to terminate breastfeeding early (before 12 months) in Guyana, infants do not have a source of high quality protein unless they consume eggs, milk, or meat. Combinations of legumes and grains are adequate for adults and older children, but infants, whose needs are much higher, need animal protein.

CEREX, the locally produced infant food, using local and AID-Imported ingredients, may fill this need for some infants. However, during the current food shortage, it has been reported that this nutritious food, CEREX, is being consumed by all members of the family.

Increasing the availability of at least one source of animal protein for low income families should have a high priority in the national food and nutrition plan. However, its importance is not equal to that of increasing legume production.

In the analysis provided in a report by Edward J. Stone, a tropical livestock consultant (Agricultural Sector Planning (Checchi 1982)), a number of constraints to the growth of the livestock industry are discussed. One of the most important bottlenecks is the lack of adequate quality and quantity of animal feed. This will particularly impact on the poultry industry.

Since imports of animal feed are restricted because of lack of foreign exchange, local sources must be found. There are several opportunities for satisfying this need and meeting a direct human nutrition need as well.

Corn Production

Corn production in Guyana has deteriorated in recent years, but the record of production in prior years is evidence that the potential exists for producing corn for animal and human consumption. During the period of 1970 to 1976, production increased from 4.1 million pounds with an average yield of 1,500 pounds per acre to 12.8 million pounds

with an average yield of 2,000 pounds per acre in 1975. The production increase can be attributed to the strong price policy followed by the Guyana Marketing Corporation. In the years following, prices to farmers declined, production dropped, and the Guyana Stockfeeds Ltd. imported an average of 96 percent of its corn needs during the 1979-81 period*. Table IV-B-5 shows the production patterns for the past decade.

Table IV-B-5
CORN PRODUCTION AND YIELDS (1970 - 1980)

Year	Area	Production	Yields
	(Acres)	(Million lbs.)	(Pounds/acre)
1970	3,154	4.1	1,299
1971	3,393	5.3	1,565
1972	3,650	6.2	1,699
1973	4,557	6.6	1,448
1974	3,000	6.0	2,000
1975	NA	12.8	NA
1976	NA	9.5	NA
1977	NA	7.2	NA
1978	NA	4.6	NA
1979	NA	3.7	NA
1980	NA	3.7	NA

Source: Ministry of Agriculture, Resource Development and Planning Division. (Mr. Prabhu Sookraj, Chief; Mr. Chanderoot Gopaul, Agriculturist, and Mr. Ronald Annamunthodo, Economist). As cited in Amorin and others, Indigenous Commodities for Guyana Weaning Food Development Project.

* Cesar Amorin and others, Indigenous Commodities for Guyana Weaning Food Development Project (Project No. 502-0073). A Report to the Pharmaceutical Corporation and the U.S. Agency for International Development, March 1982.

In 1980, the Guyana Stockfeeds Ltd. used a total of 17,455 metric tons of corn, both imported and domestic. If domestic production would return to its high of 12.8 million pounds, or 5,798 metric tons, that could satisfy one-third of the total need for corn by the feed industry. This estimate is based on the highest annual importation of corn during the period 1979-81.

On the other hand, some of this production can and should be used for direct human consumption. In 1979, farmers sold 30 percent of their crop, or 526 metric tons, for human consumption. This quantity allowed for about four grams of corn available daily. To put this in perspective, the average daily per capita consumption of corn in South America is about 80 grams daily.

While the consultant is not suggesting that the Guyanese change their food habits from white bread to tortillas, increased corn consumption can fill part of the protein and calorie gap left by declining wheat consumption.

Locally produced corn could be made available for human consumption by producing other crops which would substitute for or complement corn as a feed grain.

Cassava Production

Cassava is used in Western Europe for animal feed, based on imports from Thailand, Indonesia, and South America. Guyana is a natural growing area for cassava, but there appears to be insufficient volume to meet demand as direct human food. Improved varieties from CIAT (Centro Internacional de la Agricultura Tropical), Cali, Colombia, would decrease maturation time and increase productivity. Investment in this food crop will support both the demand for animal feed and human consumption, filling in part the calorie gap left by the decreased imports.

Coconut Production

Coconut production has considerable potential in Guyana. The current production, indicated in the table below, would satisfy, together with groundnut oil, the demand for edible oil. The presscake remaining from the oil processing as well as the whole copra can be used for animal feed.

Table IV-B-6

COCONUT PRODUCTION AND YIELDS (1970 - 1980)

Year	Area (acres)	Production (Mil. lbs.)	Yield (Pounds/Acre)
1970	46,957	30.7	654
1971	47,125	29.6	628
1972	47,130	28.5	605
1973	48,000	27.1	565
1974	NA	26.4	NA
1975	NA	31.3	NA
1976	NA	32.4	NA
1977	NA	25.2	NA
1978	NA	25.0	NA
1979	NA	35.3	NA
1980	NA	42.2	NA

SOURCE: Ministry of Agriculture, Resource Development and Planning, as cited in Amorin and others, Indigenous Commodities for Guyana Weaning Food Development Project.

Soybean Production

Soybeans are another excellent source of proteins and calories both for human food and animal feed. The CEREX infant food project in Guyana is currently importing soya flour and soya oil. Under current planning, these ingredients are to be produced in Guyana in sufficient supply to eliminate the need for importation. At current production levels, 750 acres will be required to produce adequate supplies of

soybeans for the CEREX project. There may be as much as another 1,200 acres under soybean cultivation in Guyana today.

At the very modest yield rate of 800 pounds per acre, the remaining land could produce 435 metric tons. After pressing for oil, the presscake could be used in animal feed.

Soybean production has been studied for more than a decade, first with assistance from the University of Florida and later with help from the University of Illinois. After this investment, it would seem that commercial levels of production ought to be feasible if careful attention is paid to production techniques.

Rice Mill By-Products

The by-products of rice production -- rice bran and broken rice kernels -- can also be used for animal feed, substituting for corn. In addition, rice oil produced from the bran is an excellent vegetable oil. In most countries, rice bran oil is produced by the solvent extraction process and the residual bran, called "defatted bran," becomes a superior feed because it is stable. On the other hand, fatty bran turns rancid in a few hours and is toxic for young chickens and less nutritious for other animals than defatted bran.

6. Education and Public Health Recommendations

In the past two decades, it has been recognized in many countries that nutrition goals can be solved best through the involvement of several ministries. In Guyana, the National Food and Nutrition Council consists of members from agencies concerned with health, education, agriculture, trade, development, and planning. Finally, the Caribbean Food and Nutrition Institute, through CARICOM's member states, has developed a CARICOM Regional Food and Nutrition Strategy. These approaches also recognize that food and nutrition policy must address the concerns of several sectors and disciplines.

Reallocation of food within the household can have a measurable impact on the nutritional status of infants and young children in the household. More than half of the children under five years of age in Guyana are underweight. In many cases, the calorie and protein gap for these children is a fraction of the total food intake of the household. A slight redistribution of the total food available can fill this gap. The following excerpt from an article by a Caribbean nutritionist illustrates the role that food redistribution can have:

"... the amount of food that a young child requires to meet his daily recommended allowances of nutrients is very small compared to the family's total needs. For instance, consider an average family of five composed of two adults, one adolescent, a child between five and ten years old and a "target" child between two and three years old. The family's total recommended daily energy requirement would be approximately 11,500 calories; but the requirement of the "target" child represents only about 11 percent of that figure. Hence, if all the other family members reduced their intakes by about 25 calories per day (a reduction of about one percent of their recommended daily intakes) and gave that amount to the target child, the child would receive an additional 100 calories amounting to nine percent of its daily requirement - enough in many cases to spell the difference between an adequate diet and malnutrition." *

Dietary changes can be achieved through education. Such programs need to be carefully planned and continued over many years. "Campaigns" of short duration serve only public relations goals.

A second important change in dietary practices relates to breastfeeding. On the average, breastfeeding is ended early, before the eighth month. In many rural cultures in Latin America and Africa, breastfeeding continues well into the second year. Moreover, in these countries, breast milk is offered exclusively for the first four to six

* Miguel Guerí, "Childhood Malnutrition in the Caribbean," Bulletin of the Pan American Health Organization, 15 (2) 1981.

months. In Guyana, the practice is to introduce cow's milk or bush teas in the first few months of life. Premature introduction of food provides little or no value for the infant and probably just introduces pathogens. Failure to breastfeed for as long as possible is a waste of the most important food that can be produced for infants under eight months of age. Guyana is a food-scarce country and can ill-afford this loss.

Another public health recommendation relates to improving the utilization of food, once ingested. Just as there are waste and losses in the field and storage, effectively reducing supply, there is also wasted food in the body.

All evidence in Guyana indicates that nearly everyone carries parasites, producing anemias and consuming significant quantities of food energy. While it is not possible to clean up the sources of the infections in the short run, it is possible to treat children periodically with deworming medicine. This therapy is not expensive, it is easily administered, and has few side effects.

* * * * *

There is no shortage of sound ideas or interventions that would have an impact on the nutritional well-being of rural Guyanese families. This report has recommended some of the more obvious. The feasibility of any of these suggestions depends on technical issues, to be sure; but these can be resolved. The more important variable is the political decision -- the will to act.

Several months ago, Dr. James Levinson, a distinguished nutrition policy planner, completed a study of more than a dozen successful nutrition improvement programs throughout the world. The common denominator that he found in all the cases was not a technological "fix" or the importation of an exotic methodology. The common element in all the

cases was the willingness of policy makers to vigorously advocate their programs, to risk their political futures, and to persuade the highest levels of government that they had a chance for success.

A similar situation exists in Guyana today. The necessity of reducing imports is accelerating the process of self-reliance. Investments in agriculture can benefit the residents of urban areas and provide cash crops for export; or, alternatively, investments can aim at distributing benefits to a broader sector of the population.