

BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT  
FOR  
THE REPLACEMENT OF RICE MILL  
IN  
THE COOPERATIVE REPUBLIC OF GUYANA

MAY 1989

JAPAN INTERNATIONAL COOPERATION AGENCY



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国際協力事業団

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## PREFACE

In response to the request of the Government of the Cooperative Republic of Guyana, the Government of Japan has decided to conduct a Basic Design Study on the Project for Replacement of Rice Mills and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Guyana a survey team headed by Mr. Yukio Higuchi, Inspector, Food Agency, Ministry of Agriculture, Forestry and Fisheries from January 22 to February 8, 1989.

The team exchanged views on the Project with the officials concerned of the Government of Guyana and conducted a field survey in the Project site. After the team returned to Japan, further studies were made and the present report prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Cooperative Republic of Guyana for their close cooperation extended to the team.

May, 1989



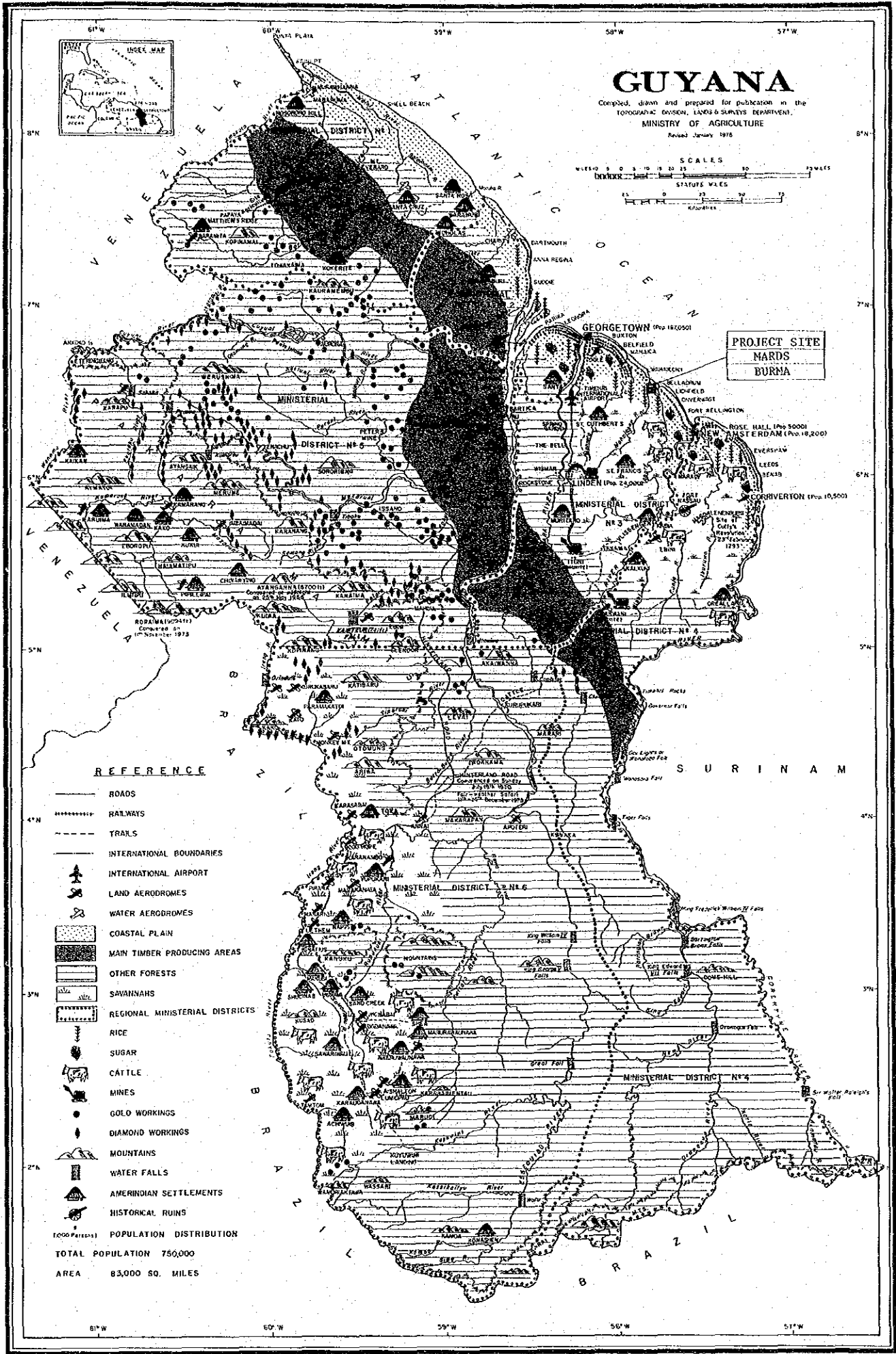
KENSUKE YANAGIYA

President

Japan International Cooperation Agency

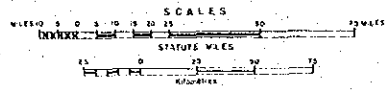






# GUYANA

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 MINISTRY OF AGRICULTURE  
 Revised January 1976



**PROJECT SITE**  
 HARDS  
 BURMA

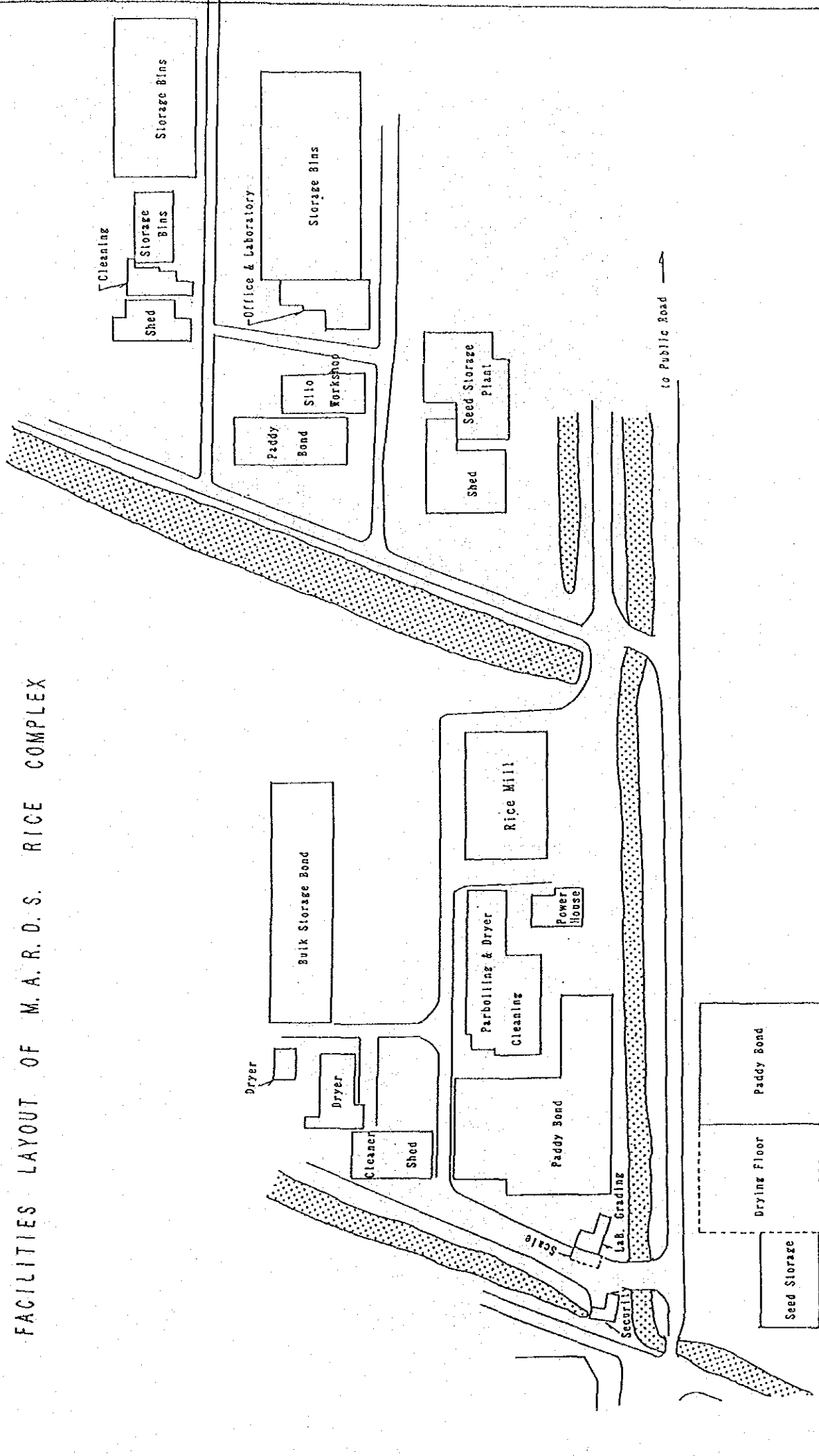
## REFERENCE

- ROADS
- RAILWAYS
- TRAILS
- INTERNATIONAL BOUNDARIES
- INTERNATIONAL AIRPORT
- LAND AERODROMES
- WATER AERODROMES
- COASTAL PLAIN
- MAIN TIMBER PRODUCING AREAS
- OTHER FORESTS
- SAVANNAHS
- REGIONAL MINISTERIAL DISTRICTS
- RICE
- SUGAR
- CATTLE
- MINES
- GOLD WORKINGS
- DIAMOND WORKINGS
- MOUNTAINS
- WATER FALLS
- AMERINDIAN SETTLEMENTS
- HISTORICAL RUINS
- (1000 PERSONS) POPULATION DISTRIBUTION
- TOTAL POPULATION 750,000
- AREA 83,000 SQ. MILES

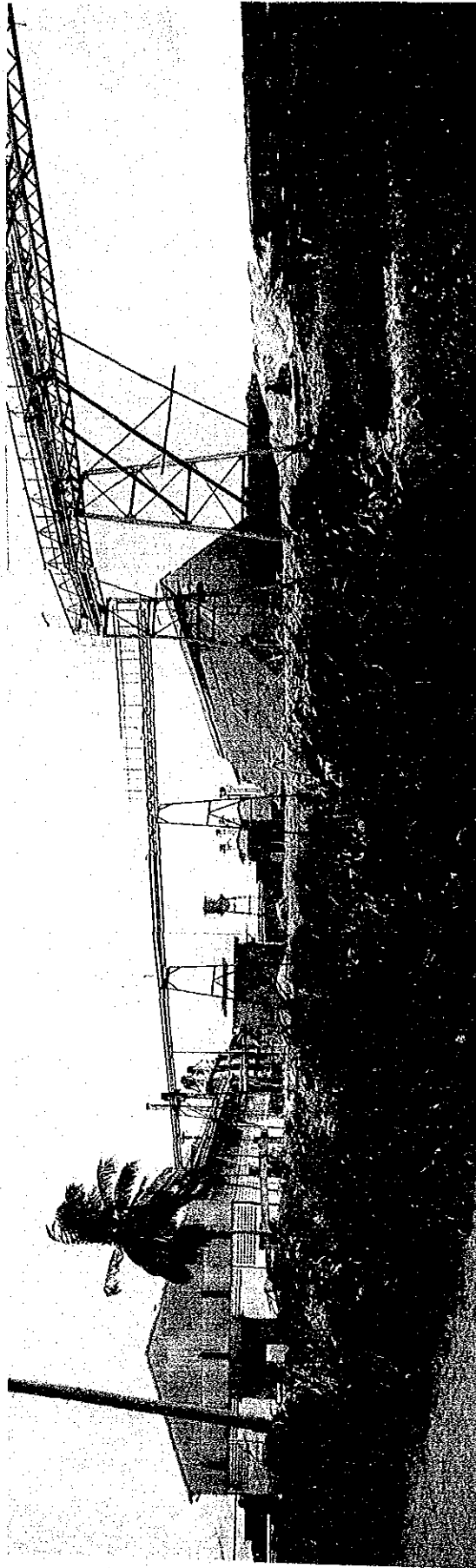
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FACILITIES LAYOUT OF M. A. R. D. S. RICE COMPLEX

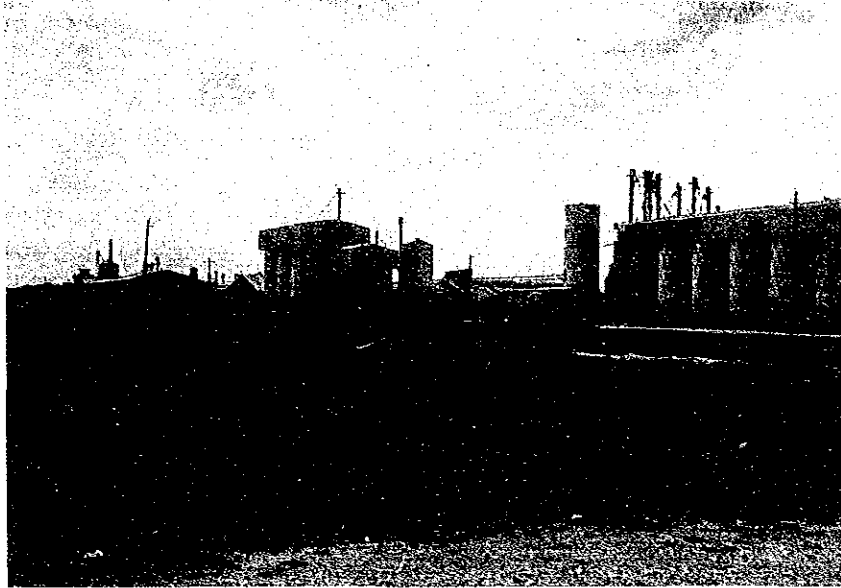






1. MARDS Rice Mill Complex ..... Building in the left is the existing rice mill, Building in the right (triangle roof) is a paddy storage which is requested alternative plan for installation of paddy husking section.





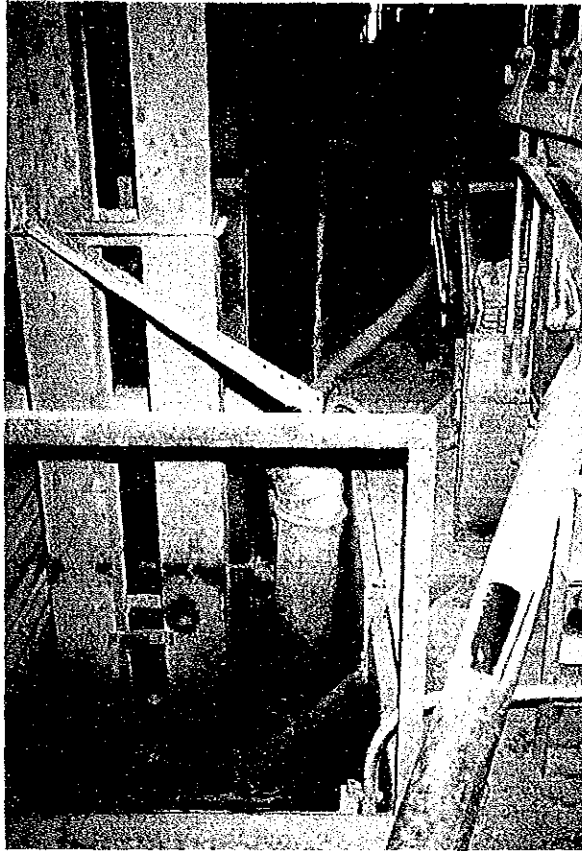
2. Paddy storage Silo ... in the right, paddy is conveyed to rice mill (left end) by conveyor.



3. Parboiled Rice Plant ... Presently under repairing.





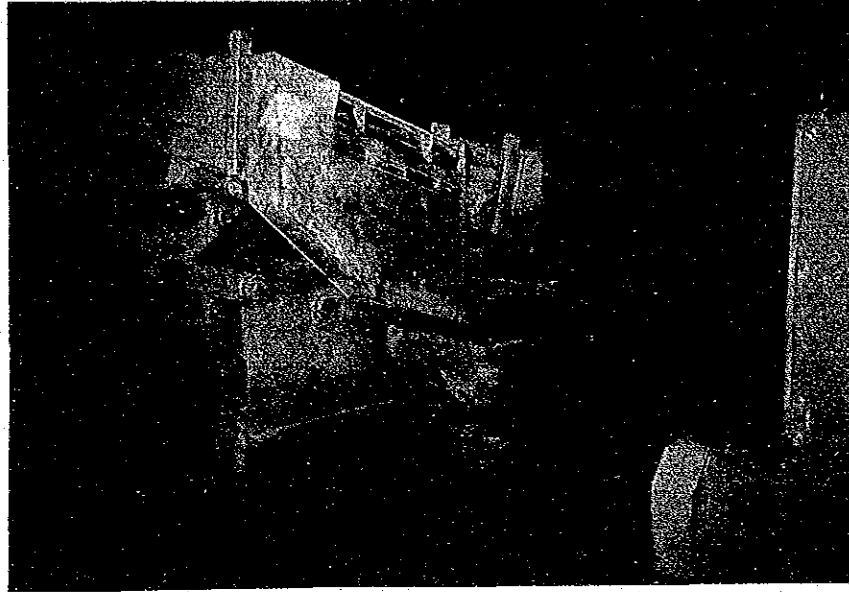


4. Elevator for Paddy Separator...excessively worn out.

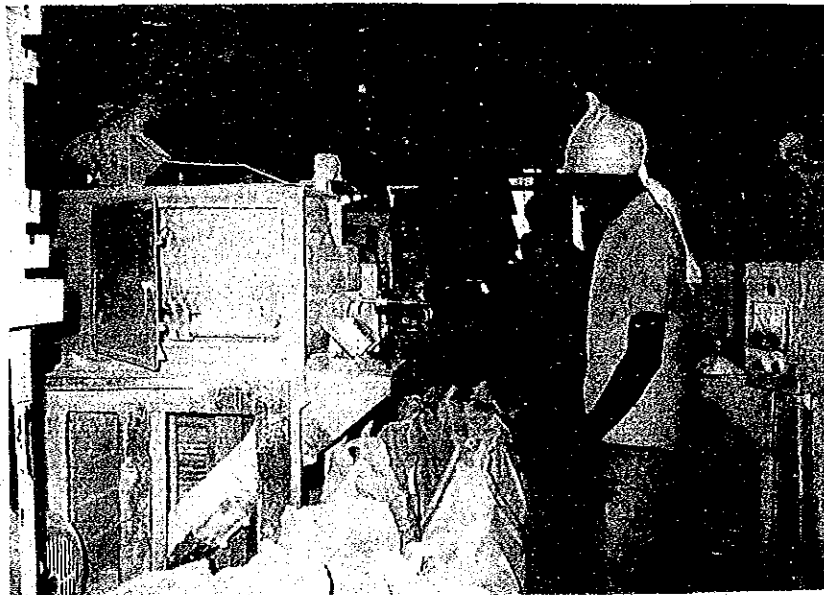


5. Rice Mill Plant, from Rotary Sifter to Whitening Machine ...right side line is not operated due to lack of spare parts.





6. Paddy Separator ..... excessively worn out, miserable traces of repairs.



7. Whitening Section ..... only left side line is operated, bran fly in all direction due to no function of bran collecting system.



## SUMMARY

The Cooperative Republic of Guyana (hereinafter referred to as "Guyana") achieved its independence from British governance in 1966, shifted to a republic in 1977, and has been governed by a president since 1980.

After the independence, Guyana aimed for economic self-reliance, and has nationalized all most of its main industries under its socialistic policy, based on the cooperative system.

The economy of Guyana depends primarily on agriculture with a gradual trend toward industrialization. The main industrial products are white milled rice, refined sugar (including raw sugar), glass (bottle), cotton textile, vegetable oil, processed leather, shoes, etc. In the scope of Guyanas economy, the agriculture, forestry and fishery field play an important role. The main agricultural products are sugar and rice, both of which are important export cargoes, providing a major sources of earning foreign money needed to maintain the whole economy. Also important in this context are bauxite in its mineral industry, and shrimp in its fishery industry.

Under this economic situation, The Guyana government places top priority on agriculture, and makes a positive effort to increase rice production by giving it a position as a national policy, as well as implementating irrigation projects, including recently completed ones as well as ongoing ones.

The national staple food in Guyana is rice, and its production rate is about double that of demand. The surplus rice is exported to countries in the Caribbean Sea area and to Europe, providing foreign income.

However, not all surplus rice is exported. The amount of export is only about one-fourth of production (about 40,000 tons as milled rice).

The hindrance factor in exporting rice is derived from the following situation.

Among the 8 rice mill plants owned by GRMMA, (Guyana Rice Milling and Marketing Authority, a governmental organization for rice milling and marketing in Guyana), especially the MARDS Rice Mill Plant, the major plant, is heavily worn out.

In spite of the fact that actual disposing capacity reduces to 40% of so-called capacity in two sets, 10 tons/hr. each, a certain fixed amount of paddy is procured every year, and such deteriorated facilities are compelled to use it. Hence, paddy is constantly piled up in storage as old rice. Such bad conditions have been accumulating, causing an inability to dispose of total paddy and a decline of milled rice quality. Those situations have caused the depression of rice exports.

In order to alleviate these present conditions, the Guyana government has aimed for the production of quality rice competitive with international markets as its main agricultural product to earn foreign money for economical self-reliance, as well as to maintain stable supply of good quality milled rice for domestic demand.

For this purpose, the Guyana government has planned the Project for Replacement of the MARDS Rice Mill Plant, which might help export expansion, and requested to the Japanese government for Grant Aid Cooperation to implement the said Project.

In response to this request, Japanese government decided to conduct the Basic Design Study and Japan International Cooperation Agency dispatched the study team to Guyana from January 22 to February 8, 1989.

The team carried out a field survey, collected related information, and held discussions with representatives and engineers of the Guyana organizations concerned.

The team confirmed with the content of the request and examined the justification of the project, and content of facilities required for the Project.

The examination on study results proved that the Project has a high priority as one of achieving measures for economic self-reliance in Guyana, and the team believes that this Grant Aid Cooperation has value, and is important to improvement of Guyana's economic condition, in addition to promoting friendly relations between the two countries.

Outline of justification for the project, the scale and content of the plan and appraisal of the project are as follows.

#### 1. Proof of Project Justification

GRMMA is in charge of the manufacture, purchase, sale, and distribution of paddy/rice in Guyana. GRMMA itself owned eight (8) Rice Mills in the country, and its share of milling capacity is about 35% of the total rice milling industry.

GRMMA purchases from producers about 52% of the national total production of paddy every year. Though, the existing rice mills, are superannuated, and milling capacity has been dropping remarkably. Under these circumstances, in rice harvest season, paddy storage facilities are always kept filled due to extremely low milling capacity. And occasionally rice cultivating farmers have to line up for a long time until the necessary storage space for receiving their paddy becomes available. The above fact discourages any potential increase in production, and has an adverse affect on the national policy of increasing exportation of rice. In response to this critical situation, GRMMA has improved the facilities of four (4) rice mills through rehabilitation efforts in recent years. But one of the main rice mills (MARDS Rice Mill Complex), needs a complete replacement of the facility, although this effort is constrained due to limited technical and financial resources. In this circumstance, the Government of Guyana requested Grant Aid from the Government of Japan in order to the replace the rice milling plants at the MARDS Rice Mill Complex.

The MARDS Rice Mill is located in the East Coast Demerara, Region 5. It is the largest Paddy production area in the country, and also MARDS has been procured a large quantity of paddy from Region 4 and 6. Therefore, the goal of this project is not only the improvement of management of the MARDS Rice Mill, but also increased exportation of rice, and promotion of farmers' welfare in these areas. Furthermore, this project will effect the entire rice milling industry, including the private sector.

## 2. Outline of The Project

The objectives the project are to contribute management assistance to the MARDS Rice Mill and economic stabilization of the country through expansion of rice exportation. To this end, replacement of MARDS Rice Mill, and its effective utilization, can result in improvement of milled rice, both quantitatively and qualitatively. Moreover, this project will help the Rice Development scheme, and will contribute to elevation of farmer's income, among other benefits.

Required facilities for this project are as follows.

- (1) Rice Mill Facilities: 10 ton/hr (Paddy) 2 line
- (2) Quality Inspecting  
Equipment : 1 lot

## 3. Executing Agency of The Government of Guyana

Name of Agency : G.R.M.M.A.  
(Guyana Rice Milling and Marketing Authority)

## 4. Maintenance Plan

- (1) Budget for Maintenance (Plan effected year of 1991)
  - 1) Spares and Stores: G\$1,834,000,000 (Comparison 1988: 640%)  
G\$1,663,000,000 (Comparison 1988: 370%)

## 5. Maintenance System

- 1) Workshop : MARDS has a Central Workshop where repairing of shaft, rewind of electric motor, welding work etc can be done.
- 2) Manpower : One(1) each of Chief Engineer and Assistant Engineer, nine(9) Mechanics, Three(3) Electrical Technicians and one(1) Welder are available in duty under rice mill complex.

## 6. Estimated Project Cost

- (1) Cost borne by the Government of Japan (in Yen):  
About | Million
- (2) Cost borne by the Government of Guyana  
G\$10 Million (about ¥61 Million)



Note: Exchange rate (as of Feb. 1989):

1US\$=21G\$=128.57 Yen

1G\$ =6.12238 Yen

abridged 1G\$=6.12 Yen

above exchange rate (1US\$=G\$21) is an official rate at the Chase Manhattan Bank, Georgetown Branch in Guyana.

## 7. Implementation Plan

Implementation work is required approximately seventeen(17) months after signing the Exchange of Notes, therein about eleven(11) months hold for actual construction and installation work (a period of starting construction work by Guyana side and installation, test running and commissioning of the facilities/machineries).

## 8. Project Evaluation

The project is considered to have following effects:

### (1) Direct Effects:

- 1) Improvement of Milling Recovery and Quality of Rice, as a result of the replacement of the MARDS facility.

In 1988, they produced milled rice that, in terms of Milling Recovery, is 57% and Whole Grains of 23% (from paddy basis). By using New Rice Mill Facilities, the former rate will advance to 64% and the latter to 38%. There, the grade of milled rice will improve to B or A class according to GRMMA's quality specification, instead of C class milled rice, which is presently producing at MARDS Rice Mill.

- 2) Increasing of Profit for the MARDS Rice Mill

Related to above-stated, on increase of gross income could be expected from the improved quantity of milling recovery and quality as follows:

\* On Grade B conversion : G\$71,078,400

\* On Grade A conversion : G\$73,706,300

\* On Exportation increasing: G\$15,306,000

- 3) Supply of Quality Rice to the Nation

Marketing and distribution of quality rice with meet the demand of the public.

(2) Indirect Effects:

1) Increase of milled rice production

25,000 tons to 51,200 tons (paddy handling: 80,000 tons).

2) Increase of rice exportation

Presently, MARDS is exporting about 40% against its total products, and 8,885 tons is the average in the last three(3) years (1986 - 1988). However, this ratio will increase to 60% if expansion of rice exportation goes favorably because of improvement in the quality of products. Theoretically, it would be possible to export rice of 30,720 tons.

9. Conclusion

The Guyana Government has worked toward expansion of exportation of the agricultural products to provide a self-supporting national economy. In particular, increased production of rice and improvement of rice quality are the most important factors for obtaining foreign money.

MARDS Rice Mill Plants owned by GRMMA is the largest of the country's rice mills and the center of the country's rice milling industry. In spite of this fact, present conditions of this rice milling plant have deteriorated so much that huge losses in term of quantity and quality of milled rice have occurred.

Regarding this Project, if The Government of Japan cooperates in the renewal of MARDS Rice Mill, the Government of Guyana could find success in earning foreign money by expansion of rice exportation. This would occur through improvement of the quality of rice and increased production of milled rice which, in turn, contributes to a self-supporting national economy for Guyana. This project will also supply quality rice for the nation, as well as positively effecting Guyana's private rice millers. Furthermore, increased exportation of rice and improved of procurement systems will be effective for preventing a fall in price as well as resulting in a price increase due to quality improvement. These benefits are all related to promoting the farmer's welfare.

This Project has a good chance to contribute for aforesaid objectives and it is considered to be appropriate for Japan's Grant Aid Cooperation Programme.

## 10. Recommendations

The following are recommended to the Government of Guyana in order to effectively implement and operate the Project

- (1) To ensure that major undertakings be taken for implementation of the project.
- (2) To secure a sufficient budget previously submitted during the surveying, for the project implementation and operation of the new rice mill plants.
- (3) To secure manpower for MARDS Rice Mill, according to the presented plan by the G.R.M.M.A. for strengthening manpower.
- (4) To ensure appropriate maintenance for the new rice mill facilities.



## Abbreviation

1. DIEC - Department of International Economic Co-operation
2. FAO - Food and Agriculture Organization of the United Nations
3. GREB - Guyana Rice Export Board
4. GRMMA - Guyana Rice Milling and Marketing Authority
5. IBRD - International Bank for Reconstruction and Development
6. IDA - International Development Association
7. IDB - Inter-American Development Bank
8. MARDS - Mahaicony Abary Rice Development Scheme
9. M/D - Minutes of Discussions
10. MMA/ADA - Mahica Mahaicony Abary/Agricultural Development Authority
11. NARI - National Agricultural Research Institute
12. NORGC - National Paddy and Rice Grading Center
13. UNDP - United Nations Development Programme



## C O N T E N T S

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LOCATION MAP AND PERSPECTIVE

M.A.R.D.S. RICE MILL COMPLEX (PHOTOS)

SUMMARY

ABBREVIATIONS

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**CHAPTER 1**

**INTRODUCTION**



## Chapter 1 Introduction

The Government of the Cooperative Republic of Guyana (hereinafter referred to as "the Guyana government" and "Guyana" country) has a role to procure from farmers a certain fixed amount of paddy every year, even under such severe condition that the operation capacity of rice mills turns down to about 40% from the original so-called capacity, due to the extreme deterioration of rice milling facilities in the MARDS Rice Mill Plant owned by GRMMA (Guyana Rice Milling and Marketing Authority).

Furthermore, the government states that the above situation causes the accumulation of old rice. This accumulation, together with the deterioration of rice milling machines has a multiplication effect, resulting in the declination of milled rice quality, sometimes to the worst stage, in which the inferior rice can be used only for animal feed. Subsequently, Guyana suffers from huge economic loss in both quantity and quality of rice.

Therefore, in order to solve these problems, the Guyana government made a request to the Japanese government for Grant Aid Cooperation as to the Project for Replacement of MARDS Rice Mill Plant (Region IV, V and VI), located in the main area of rice production. MARDS is a major plant among 8 Rice Mill Plants owned by GRMMA.

In response to the request, the Japanese Government decided to conduct the Basic Design Study (hereinafter referred to as "the Study") on the said Grant Aid Cooperation, and JICA dispatched to Guyana a Basic Design study Team (hereinafter referred to as "the Team") headed by Mr. M. Higuchi, senior officer, Inspection Division, Food Agency, Ministry of Agriculture, Forestry and Fishery.

The Team confirmed the contents of request proposed by the Guyana government and carried out a field survey, examined the background of the Project, and examined the existing machinery and equipment.

In addition to the above, the Team especially explained to the intricacies of Japan's Grant Aid.

The Team discussed, confirmed and delineated the roles of various tasks between Guyana and Japan for the preparation and implementation of the Project.

As a result of the Study, both parties of the Guyana government and the Team formed the Minutes of Discussion concerning the essential matters to be confirmed for the Project, and exchanged affixed signatures on the Minutes of Discussion. The signatures were those of Dr. Rajana, Head of Department of International Economic Cooperation and by Mr. Y. Higuchi, the Team leader on January 31, 1989.

Based on the discussion held with concerned staff and engineers of the Guyana government, and based on the analysis of data collected by the field survey, the Team carefully examined the justification for the Project and worked to conclude a proper decision on the Basic Design. Those conclusions are embodied in this report.

## **CHAPTER 2**

### **BACKGROUND OF THE PROJECT**





## Chapter 2 Background of the Project

### 2-1 General Condition of the Country

#### 2-1-1 Nature and Environment

The country of Guyana is located in the northeast part of South America between 2° and 8° north latitude, just north of the equator, and between 57° and 60° east longitude. It is contiguous to Venezuela on the west, to Brazil on the south, to Surinam on the east and to the Atlantic Ocean, with 430 km of coast line.

Among the three parts of Guyana, the coastal area is a plain of fertile alluvial soil, with the size of 320 km in length and 15 - 60 km in width. The central area is also a plain, and the southwest area is highlands.

Although the coastal area constitutes only about 5% area of the country, about 94% of the total population inhabits it. A plain of 15 - 20 km in width toward the inland area is intensively cultivated, producing rice and sugar cane. The majority of cultivated fields on this plain are 0.5 - 1 meter below sea level at high tide, and protected by comprehensive facilities such as break-water, dam, canal and so forth. At low tide, rain water and collected water are drained, thus maintaining cultivation.

There is a highland area on the inland part of coastal plain, where there are no inhabitants. This area is covered with an equatorial-type forest mountains, and lakes. Buried in the ground are minerals such as bauxite, gold, diamond and others. In the southwest part of the country, there is a grassland, so-called "pupununi", where there are few inhabitants but where livestock farming is thriving.

In the western part of the country, there is the Pakapaina mountain range covered with forests and grasslands, where Mt. Roraima, the highest mountain at 2,810 m, is located.

There are many rivers with plenty water in the country and Demerara, Berbice, Essequibo, etc are important rivers for transportation of goods, as well as a source for irrigation.

The weather of Guyana is of typical equator type, having two rainy seasons and two rather dry seasons. The weather condition in the coastal area is as follows:

a long rainy season: middle April to middle August  
a long dry season: middle August to middle November  
a short rainy season: middle November to middle February  
a short dry season: middle February to middle April

However, even during the dry season, there is precipitation ranging between 50 and 150 mm every month, subject to district variation.

The precipitation varies, but average annual precipitation in the last ten years is as follows:

Region III (George Town district) : 2,391 mm  
Region V (Burma - Mards district): 1,787 mm  
Region VI (New Amsterdam district): 1,715 mm  
Forest and mountain area: over 3,500 mm  
Pampas on inland area: below 1,500 mm

As for the temperature, the coastal area ranges from 24°C min. to 32°C max. and its humidity varies from 63% min. to 78% max. on average very month.

#### 2-1-2 Socio-economic Structure

After the independence (1966), the government promoted a socialistic policy, and the main domestic industries were almost all nationalized. Thus, the government actively intervenes directly in the economy. Official enterprises broadly extend to such industries as rice milling, mining, sugar industry, aviation, transportation, electric power, telegraph and telephone, agriculture, forestry, fishery, banking, insurance, shipbuilding, etc. under the control of GUYSTAC, a governmental organization.

As a diplomatic policy, it advocates a Non Allied Doctrine and works in close cooperation with socialist countries. However, recently it has given indications that it intends to lessen its socialistic line in an attempt to improve both diplomatic relation with Western countries and its foreign investment situation.

At one time, due to an overextended socialistic policy, not only capitalists, but also many capable specialists and highly trained engineers drained abroad. Because of the political system, there were few chances for such people to find jobs, and it limited capital activity. This condition was a significant factor preventing the development of Guyana.

Because of a realization of this fact, the present government continues its effort to dispatch special missions to several countries, requesting capable expatriates to return and assist in the development of their country.

The Guyana government advocates the policy of economic self-reliance and aims at the promotion of economic development, improvement of national income, and fair distribution of national income through the cooperation of both public and private sectors. The present aim for economic development is:

- (1) Acceleration of economic growth rate by promotion of industries.
- (2) Development of employment
- (3) Improvement of international trade balance, etc.

Under the present circumstances, it is required to promote the increase-ment of traditional export goods (bauxite, sugar, rice) for the strategy of short and middle term. For the long term strategy, it is also, required to implement the divergent exports, develop substitutional goods industries against import goods, and consolidate its infrastructure.

The present condition of the Guyana economy largely depends on bauxite, sugar and rice (which are the main agricultural products), the export of which is an important source for earning foreign money. As of 1986, the average per capita annual income is estimated at around US\$560, GDP: 513.7 million and GNP: 448.1 million.

These three commodities occupy about 40% in GDP (Gross Domestic Products) and about 80% among acquirement of foreign money.

Remarks: Reference is this data is contained in APPENDIX-1, which shows comparatively recent data.

## 2-2 General Condition of Agriculture

### 2-2-1 Agricultural Situation in Guyana Economy

In Guyana, the ratio of agriculture, forestry and fishery fields to GDP was 22% in 1979 and gradually increased to 23.5% in recent years. The role of those fields in the Guyana economy is very important at present, as well as in its future.

The main products are sugar cane and rice, and both are very important export cargoes for acquiring foreign money, acting as a large supporting pole for the whole economy.

However, the economy of Guyana is experiencing difficulty in expanding, due to the decline in world markets for sugar in agricultural products and bauxite. Adding to this factor, the price of oil, which rose after the oil crisis, has had a huge influence on the balance of foreign money because Guyana depends on the import of oil to supply all domestic demand. The fluctuation of foreign exchange rate is also a factor.

The valance of foreign currency in recent years (1984 - 1986) are as follows.

(Unit: million US\$)

	1984	1985	1986
Export (F.O.B.)	246.3	243.7	252.8
Import (C.I.F.)	284.7	346.9	374.5
Current account balance	-38.4	-103.2	-121.7
Trade balance	2.7	-10.8	-29.8

Sources: Govt. of Guyana Statistical Bureau, IMF and World Bank.

Under these circumstances, the Guyana government sincerely works toward the increase of rice production and expansion of its exports, both of which have great prospects not only at present but in future as well. However, the realization of this effort is difficult to achieve, and total rice production has been declining in these years.

## 2-2-2 Agricultural production

The main agricultural products are sugar cane, rice and coco nuts, and they have the predominant ratio in all agricultural products.

The following table shows crop-wise production in last three years.

Table 1 Main Agricultural Production

Crop	Unit	1984	1985	1986
Sugar Cane	1,000 tons	241.9	243.0	245.4
Rice (Paddy)	"	300.0	260.1	285.1
Coco Nuts	Million pieces	10.7	11.4	13.2
Root-crops	1,000 tons	29.0	38.0	44.5
Banana	"	17.9	20.5	24.2
Maize	"	0.7	1.1	1.8
Beans	"	1.0	1.2	1.5
Pineapple	"	3.6	3.7	5.3
Tomato	"	3.0	3.0	3.7
Ground Nuts	"	0.6	0.6	1.4
Cabbage	"	1.3	1.6	2.1
Orange	"	50.0	51.0	51.0

Source: Guyana Planning Dept., Ministry of Agriculture

The above table shows the production between 1984 and 1986 of 12 main crops of which data is supposed to be tentatively compiled in outline form.

Guyana has forest areas of seven eighths (a little more than 188,000 square Km) of its total country area (about 215,000 square Km). Available field size for agriculture is said to be slightly less than 3 million hectares but actual cultivation is on 10% of the available space, 300,000 hectares.