

#### IV. 所 見



## Ⅳ. 所 見

アルコール工場建設予備調査は、フィリピン政府の要請内容を把握し、本調査で行う基本的な前提条件の確認、技術協力の可能な範囲等を明らかにするために昭和 55 年 12 月 8 日から 17 日までの 10 日間、フィリピン政府の関係機関との打合せ、現地でのプロジェクトサイトの実地調査、並びにネグロス島における砂糖工場及びアルコール工場の視察等を行い、多忙を極めたが、無事フィリピン政府との間でミニッツに署名、交換し当初予定の任務を無事遂行することができた。

本調査での留意事項については各論で述べられていると思われるので次回 F/S 本調査の実施に当たってはこれらのことに十分配慮するとともにミニッツの趣旨に沿って実行されるよう期待したい。この章では調査結果の要約とともに今後の F/S のための基本的な考え方及び留意事項を示すことにした。F/S に当たっての基本的考え方及び留意事項

### F/S に当たっての基本的考え方及び留意事項

#### 1. プロジェクトサイト

- (1) 次回 F/S の対象地としてカビテが選ばれた理由としては、タイプⅢの独立したアルコール工場であり、大消費地マニラに近く、最もデモンストレーション効果が大きく、フィリピン政府が早期に実現を期待していることに配慮する。

#### 2. プラントサイト関連

- (1) 工場用水として、使用可能な水資源確保の可能性につき十分検討する。(降雨量との関連についても検討する。)
- (2) 地盤強度
- (3) 農場とプラントサイトとの距離

#### 3. 原 料 関 連

- (1) フィリピン政府はアルコール原料としては砂糖きびを主体に考えているが、キャッサバ、さつまいもを補助原料として位置づけしている。これはキャッサバ、さつまいもをタイプⅡ、タイプⅢのアルコール工場形態に関連させ、新規農園による通年栽培、工場の通年稼働によるプロジェクトの経済的効果(特に雇用問題、農業所得アップ)、アルコールの安定供給の観点から総合的に考えている点に配慮する。
- (2) カビテにおいてのタイプⅢ工場の特徴として、フィリピン独特の小農生産形態を組織化、集合化して効率的な原料供給の母体とするとともに、それらの経済効果を高めるための組織と方策についてフィリピンとしては大いに期待している。この背景には十分配慮する。

- (3) 上述の背景からも本調査は、農園開発と工場建設と一体にした調査でなくては意味がなく、工業セクターと農業セクターとの関係が必要であり、工業セクターとしても原料の低廉かつ安定的確保の観点から独自にスタディを行う必要がある。
- (4) アルコール製造原価に占める原料費のウェイトは高く、工場におけるアルコール製造原価を下げる意味から原料の生産コスト、輸送コスト、工場渡し価格等について十分に検討する必要がある。
- (5) その他留意する事項
  - 現地における砂糖きび、キャッサバ、さつまいもの生産性の比較
  - カビテでの土地所有状況及び利用状況
  - 原料の栽培に利用できる農園の面積
  - 農民組織
  - 農家収入の確保
  - 原料の合理的な集荷、輸送システムの検討（特に雨期での）

#### 4. アルコール工場関連

- (1) 50~60kl/日の規模とし、稼働日数を200日とするが稼働日数300日に増加させる方法についても十分に検討する。
- (2) 投資効率が最大となるように配慮し
  - ミリング効率
  - エネルギー効率
  - 投資基準を守る。
- (3) アルコール工場の燃料（非化石燃料）の確保についても十分に検討する必要がある。
- (4) 電力及び用水の確保はSelf-Supporting Systemで行う。
- (5) 原料の受け入れ形態及びその方法、貯蔵能力及び受け入れ方法を検討する。
- (6) 原料（砂糖きび）の前処理は総建設コストに占める割合が大きくどのようなシステム（設備の型式、規模、基数等）とするか十分な検討が必要である。また圧搾汁の清浄が必要であるかどうかを検討する。
- (7) アルコール廃水の処理システムの設計及び投資額は、どの程度環境の基準を守るかによって決定されることから十分にそれら基準を検討する。
- (8) 副産物の利用については実態に即応し、経済性を考慮して検討する。
- (9) 工場労働者の確保の可能性、教育レベルについて検討する。
- (10) 工場のマネジメントについて検討する。

## 5. 経 済 性

- (1) アルコール工場が民間企業でも独立採算がとれるよう配慮し、そのためのインセンティブについてもあわせて検討する。
- (2) フィリピンの慣習的、伝統的方法である原料価格形成制度（例えば分糖率等）に配慮し、合理的決定方式について言及する。
- (3) プラントサイトの立地点は原料コスト、工場用水の確保、アルコール輸送コスト等の総合的観点から決定する。

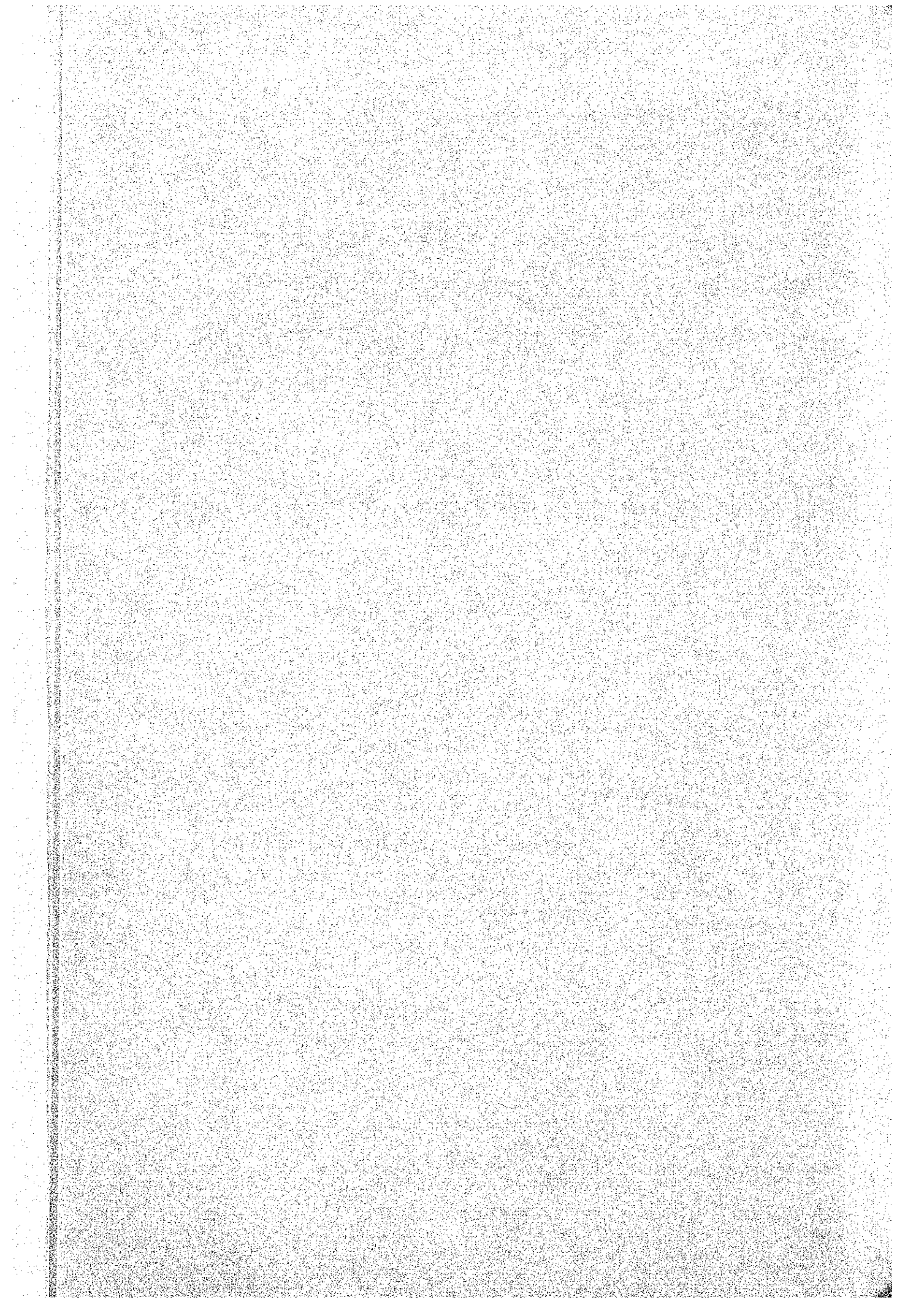
## お わ り に

以上をもって今回の我々、事前調査団の報告書とするが本報告書がフィリピン政府のアルコール計画に係るアルコール工場建設のためのF/S調査団のためのよき踏み台となり、また今後同種のバイオマス技術協力の参考となれば幸いである。

終りに当たり、本事前調査の実施に終始誠意をもって協力をいただいたフィリピン共和国の関係者、在フィリピン日本大使館、外務省、通商産業省、農林水産省等関係各位に対し深く謝意を表すものである。



附 属 资 料





MINUTES OF MEETINGS

ON

THE FEASIBILITY STUDY

ON

THE ALCOGAS PROJECT

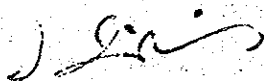
IN

DASMARINAS, CAVITE

IN

THE REPUBLIC OF THE PHILIPPINES

DECEMBER 16, 1980 Manila



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SHOJIRO IMANISHI  
Leader of the Preliminary Survey  
Team for the Alcogas Project



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ELPIDIO L. ROSARIO  
Leader of the Philippine  
Team for the Alcogas Project

MINUTES OF THE MEETINGS  
(December 9-16, 1980)

The preliminary survey team sent by the Japan International Cooperation Agency (JICA) and the Philippine counterparts have discussed the study of the Alcogas Project in the Republic of the Philippines. Members lists of both sides are attached in Annex I. Both sides agreed on the Implementing Arrangement attached in Annex II and in that connection both sides had the following discussions:

1. Both sides agreed to have a study conducted on the Dasmariñas, Cavite area. Both sides also agreed to consider taking up another site for study at a later stage, while taking the results of the study on the above-mentioned site into consideration.
2. Both sides agreed that an objective analysis of the various feedstock alternatives (sugarcane, sweet potato and cassava) will be undertaken and the best feedstock will be considered on the basis of
  - 1) suitability to the area;
  - 2) cost of production;
  - 3) stability of supply; and
  - 4) processing considerations.

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The Philippine side expressed the desire to give emphasis also to sweet potato/cassava in accordance with the policy of raw material diversification. The Japanese side, however, cited several problems which may make the planned study on the use of sweet potato/cassava as a raw material still premature. These are:

- a) Technology of large scale cultivation in the Philippines
- b) Weevil protection for sweet potato
- c) Breeding of a variety most suitable for the natural conditions in the Philippines
- d) Energy balance
- e) Additional investment on saccharification facilities
- f) Technology of fermentation of cassava

Nevertheless, a general study on sweet potato and cassava will still have to be undertaken before a final recommendation on the raw material is made and adopted as the subject of the more comprehensive study.

3. Both sides agreed that the study shall include all

aspects directly related to the functioning of the project from farm development, raw material production and processing up to the production of anhydrous alcohol.

4. The Japanese side offered to have distribution, storage and consumption of Alcogas covered under the study on the grounds that the study had best deal with the entire system from cultivation of raw materials to the consumption of produced alcohol.

Both sides understood, however, not to include distribution, storage and consumption of Alcogas in the study in view of the assurance given by the Philippine side to the effect that the Philippine side alone could deal with the matter.

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LISTS OF  
JAPAN INTERNATIONAL COOPERATION AGENCY  
TEAM MEMBERS  
AND  
REPUBLIC OF THE PHILIPPINES  
TEAM REPRESENTATIVES

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
REPRESENTATIVES

---

- 1) IMANISHI, SHOJIRO  
Director,  
Development Cooperation Div.,  
Economic Cooperation Bureau,  
Ministry of Foreign Affairs
  
- 2) NAKAZAWA, AKIRA  
Development Cooperation Div.,  
Economic Cooperation Bureau,  
Ministry of Foreign Affairs  
  
(Agricultural Field)
- 1) HIURA, MICHIO  
Director,  
Planning Department,  
Agricultural Land Development  
Corporation
  
- 2) KUDO, MASAAKI  
Director,  
Second Crop Division,  
KYUSHU Agriculture Experiment  
Station,  
Ministry of Agriculture,  
Forestry and Fisheries
  
- 3) KAWAKITA, TOSHIHIKO  
Deputy Director,  
Upland Crop Development Div.,  
Agricultural Production Bureau,  
Ministry of Agriculture,  
Forestry and Fisheries
  
- 4) MIYAZAKI, TAKESHI  
Director, Irrigation & Drainage  
Project Office of the Lower  
CHIKUGO River Basin,  
KYUSHU Regional Agricultural  
Administration Office,  
Ministry of Agriculture,  
Forestry and Fisheries
  
- 5) TAHARA, TAKAFUMI  
International Cooperation Div.,  
Economic Affairs Bureau,  
Ministry of Agriculture,  
Forestry and Fisheries

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- 6) NISHIHATA, NORIO  
Technical Affairs Division,  
Agricultural, Forestry and  
Fisheries, Planning and  
Survey Department,  
Japan International Cooperation  
Agency
- (Industrial Field)
- 1) NIIMURA, AKIRA  
Director,  
Business Division,  
Alcohol Business Department,  
Basic Industries Bureau,  
MITI
- 2) YAMAJI, KAIZO  
Deputy Director,  
Technical Cooperation Division,  
International Trade Policy  
Bureau, MITI
- 3) URAO, HIDEO  
Biomass Policy Office,  
Basic Industries Bureau,  
MITI
- 4) TAKIZAWA, HIROO  
Alcohol Association of Japan
- 5) WADA, EIJIRO  
Japan Automobile Manufacturers  
Association (Inc.)
- 6) CHIBA, HIROO  
Petroleum Association of Japan
- 7) ISHIDA, MASUMI  
International Development Center  
of Japan
- 8) YASUKI, HIDEO  
Deputy Director,  
Industrial Survey Division,  
Japan International Cooperation  
Agency

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RP REPRESENTATIVES

- 1) ROSARIO, ELPIDIO L. PNAC, Deputy Director  
Chief, Agricultural  
Services
- 2) BALCE, NORBERTO V. PNAC  
Chief, Industrial Services
- 3) LORILLA, FRANCIS M. PNAC  
Chief, Planning and  
Administration
- 4) JAYME, FORTUNATO Ministry of Agriculture  
Energy Crops Consultant
- 5) CAMURUNGAN, RUBEN G. Philippine Sugar  
Commission  
Director, Special Operatio  
Office
- 6) SILVA, CONCHITA C. Ministry of Energy  
Planning Service
- 7) REGUNAY, JOSE Ministry of Natural  
Resources  
Planning Service
- 8) SANTOS, ARSENIO Ministry of Finance  
Bureau of Internal  
Revenue
- 9) LEGASPI, CRISANTA S. Ministry of Finance
- 10) LAGOS, JULIETA S. PNAC  
Planning & Administration
- 11) ESPIRITU, PABLO H., JR. PNAC  
Planning & Administration
12. VENTIGAN, NOEL S. PNAC  
Industrial Services



13) FORTUNO, ANDREW S.

PNAC  
Industrial Services

14) ANTONIO, EDWIN M.

PNAC  
Industrial Services

IMPLEMENTING ARRANGEMENT  
OF  
THE TECHNICAL COOPERATION  
BETWEEN  
THE JAPAN INTERNATIONAL COOPERATION AGENCY  
AND  
THE PHILIPPINE NATIONAL ALCOHOL COMMISSION  
ON  
THE FEASIBILITY STUDY  
ON  
THE ALCOGAS PROJECT  
IN  
DASMARIÑAS, CAVITE  
IN  
THE REPUBLIC OF THE PHILIPPINES

## I. Background

In response to the request of the Republic of the Philippines, the Government of Japan dispatched a preliminary survey team headed by Mr. Shojiro Imanishi from 8th to 17th December 1980, through the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation of the Government of Japan, to carry out the preliminary survey for the feasibility study on the Alcogas Project in Dasmariñas, Cavite (hereinafter referred to as "the Study") and to discuss the implementing arrangement of the Study with the Philippine National Alcohol Commission (hereinafter referred to as "PNAC").

## II. Objective of the Study

The basic objective of the Study is to examine the technical and economic feasibility of developing a farm for raw materials and establishing a municipal alcohol distillery with a capacity ranging from 50 to 60 kilo liters per day in Dasmariñas, Cavite.

## III. Scope of Work

In order to achieve the above objective, the Study will cover the following items:

### 1. Data collection on the project site

#### (1) Natural Condition

- 1) Location
- 2) Topography
- 3) Meteorology
- 4) Hydrology
- 5) Soil and geology
- 6) Vegetation
- 7) Others

(2) Social and cultural environment

- 1) Number of houses and population densities
- 2) Accommodations, schools, hospitals, religious buildings, amusement places, and stores
- 3) Security measures
- 4) Sanitation

(3) Infrastructures

- 1) Transportation
- 2) Electricity
- 3) Communication
- 4) Possibility of utilizing river water for industries and irrigation
- 5) Others

(4) Present situation of the various industries

- 1) Mining
- 2) Industry
  - Sugar mills
  - General contractors
  - Other major industries
- 3) General service companies, such as bank insurance agencies, etc.

(5) Agriculture

- 1) Present land use and major agricultural products
- 2) Land ownership
- 3) Present cropping pattern and crop production
- 4) Farm economy
- 5) Agricultural inputs
- 6) Farm labor balance and mechanization
- 7) Agricultural infrastructures
  - Irrigation facilities
  - Drainage facilities

- Farm Roads

8) Agricultural cooperatives and other farmer's association

9) Others

6) Availability of industrial labors

1) Skilled laborers

2) Factory laborers

## 2. Selection of Raw Materials

(1) Adaptability

1) Current production

2) Future production

3) Possibility of the year round production

(2) Required inputs and facilities

(3) Constraints

1) Pest and disease

2) Weeds

3) Labour balance and mechanization

(4) Supporting services

1) Research and breeding activities

2) Agricultural extension

(5) Energy balance

(6) Production cost of raw materials and alcohol

(7) Others

## 3. Raw Material Production

(1) Concept design of farms

1) Water resources development

2) Irrigation and drainage facilities

3) Land consolidation

4) Soil improvement

5) Others

(2) Cultivation Program

- 1) Rotation system
- 2) Cropping pattern
- 3) Variety selection
- 4) Fertilizer application program
  - Chemical fertilizer
  - Utilization of by-products
- 5) Weed Control
- 6) Pest and disease control
- 7) Mechanization program
- 8) Others

(3) Operation and Management

- 1) Farm organization and community development
- 2) Water Management
  - Organization
  - Management system
- 3) Soil Management
  - Sub-soiling
  - Erosion control
  - Soil improvement materials
    - Chemical products
    - By-products,
- 4) Maintenance of Machinery
- 5) Labour Planning
- 6) Supporting Services
- 7) Others

(4) Agro-economy

- 1) Marketing of agricultural inputs and products
- 2) Household economy
- 3) Agro-industry
- 4) Agricultural cooperatives
- 5) Agricultural credit

4. Alcohol Production

- (1) Raw material procurement
- (2) Technologies of alcohol production
  - 1) Selection of extractive process of raw materials
  - 2) Selection of feedstock pre-treatment process
  - 3) Selection of fermentation process such as:
    - Batch process
    - Yeast recycle process
    - Continuous process
  - 4) Study on temperature range in fermentation
  - 5) Selection of distillation process (including dehydration process) in terms of:
    - Product quality
    - Alcohol content
    - Energy efficiency
  - 6) Selection of instrumentation system
  - 7) Study on developing markets for by-products
    - Bagasse
    - Separation and utilization of yeast
    - Recovered CO<sub>2</sub>
  - 8) Examination for raising the operation ratio of plant
  - 9) Prospects of securing various fuels and determination of optimum fuel
  - 10) Examination of energy balance
- (3) Countermeasures for Environment
  - 1) Countermeasures for waste water
  - 2) Countermeasures for air pollution
  - 3) Countermeasures for noise, vibration and malodor
  - 4) Countermeasures for waste disposals
- (4) Outline of Alcohol Production Plant
  - 1) An overall scheme of alcohol production plant and determination of its capacity
  - 2) Outline of production facilities
  - 3) Features of other additional facilities (utilities,

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safety measures, storage, loading facilities, plant offices, laboratories and others)

- 4) Operation ratio of plant
- 5) Features of transportation means for products and by-products
- 6) Features of facilities to treat waste water and industrial wastes

(5) Plant Management

- 1) Schedules of personnel required
- 2) Technical training schedules
- 3) Preventive measures against industrial accidents
- 4) Plant management
- 5) Maintenance controls

(6) Process Flow Sheet for the Alcohol Plant

(7) Concept Design of the Alcohol Factory

5. Economic and Financial Analysis

(1) Estimate of Investment Required for:

- 1) Development of farm land and infrastructure for transportation of the raw materials to the distillery
- 2) Construction of an alcohol distillery which includes:
  - Production facilities (material receiving, fermentation, distillation, utilities, storage tanks and waste water treatment facilities)
  - Other facilities related to plant safety, security and overall plant administration



- (2) Estimate of Operating Capital
  - (3) Cost Estimate for:
    - 1) Raw material
    - 2) Anhydrous alcohol
    - 3) Transportation
    - 4) Other by-products
  - (4) Estimate of Benefits
  - (5) Two Sets of Economic and Financial Projections over an Appropriate Period with and without Board of Investment Incentives including:
    - 1) Income statement
    - 2) Cash flow
    - 3) Balance sheet
    - 4) Rate of return analysis
    - 5) Break-even analysis
6. Implementation Schedule
  7. Recommendation

#### IV. Study Schedule

- (1) The Government of Japan will dispatch a study team (hereinafter referred to as "the Team") through JICA within three (3) months after the preliminary survey.

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- (2) The Team will prepare and submit the following reports, including all related maps and plans, in English, within the time period indicated, to the Government of the Philippines:
  - 1) Progress Report or Interim Report, at the end of the study for the selection of a raw material (Phase I) which will take four (4) months (20 copies).
  - 2) Draft Final Report, at the end of the in-depth study on the selected raw material (Phase II) which will take three and a half (3.5) months (20 copies).
  - 3) Final Report, within two (2) months on the receipt of comments on the Draft Final Report (50 copies).
- (3) Consultations between the Philippine and Japanese sides will be undertaken at the end of each Phase of the study.
- (4) The Government of Japan will dispatch Advisory Groups during the Study for the purpose of supervision.

V. Roles of the Government of Japan:

1. The Government of Japan will dispatch the TEAM through JICA, and provide expertise.
2. The Government of Japan will extend the technical cooperation to transfer the technology related to this project for the Philippine counterparts through their participation in the study.
3. The Government of Japan will, in addition to the technical cooperation mentioned above, receive the Philippine

counterparts through the normal procedures under the Colombo Plan Technical Cooperation Scheme. The expense will be borne by the Japanese side.

VI. Roles of the Government of the Philippines

1. The Government of the Philippines through PNAC will designate a sufficient number of full-time counterparts, at least in the fields corresponding to the TEAM experts at the starting date of the Study.
2. The Government of the Philippines will arrange the TEAM's visits to relevant ministries, local governments and other public agencies and ensure that the Japanese TEAM have access to all relevant informations required for the completion of the Study.
3. The Government of the Philippines will contribute to cover the costs incurred on the following items:
  - (1) Suitable office with necessary office supplies and equipment
  - (2) Exemption from taxes, duties, and charges to be imposed on the equipment imported to the Philippines for the survey, the personal effects and incomes of the JICA experts, provided that such incomes are not derived from local sources.
  - (3) Local non-technical staff including secretaries, typists, draftsmen, and other personnel directly



related to the requirement of the Study.

- (4) Part-time helpers (excluding students) for the field survey.
  - (5) Operation cost (drivers, fuel and other) of two to four cars.
4. The Government of the Philippines will provide all relevant study reports and available data as well as maps of scale 1/5,000 and aerial photographs to the TEAM. In case such maps are not available, necessary arrangements will be made in time to meet the above Study Schedule (IV).
  5. The Government of the Philippines will permit the TEAM to conduct the field surveys upon request by the TEAM. The Government will also do the best efforts to ensure the security of the members of the TEAM during their stay in the Philippines.

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TALKING PAPER  
FOR  
THE STUDY  
ON  
THE NATIONAL ALCOGAS PROGRAM  
IN  
THE REPUBLIC OF THE PHILIPPINES

DECEMBER, 1980

JAPANESE TEAM  
SENT BY  
JAPAN INTERNATIONAL COOPERATION AGENCY  
JAPAN

## I. Background

The Philippine Government requested in January and February 1980 a study by the Japanese Government on the possibility of establishing intermediate alcohol distilleries.

According to the request:

- The Philippine Government has attached great importance to the NATIONAL ALCOGAS PROGRAM (hereinafter referred to as "The PROGRAM").
- The PROGRAM is designed to the Philippine economy to steer rapidly away from imported petroleum towards indigenous and regenerative forms of energy.
- The Philippine National Oil Company (hereinafter referred to as "PNOC") has participated in the PROGRAM to replace 20% of the total gasoline consumption by anhydrous alcohol by 1985.
- The project of PNOC in its physical implementation is envisioned to include the establishment of raw material plantations and four municipal distilleries with capacities of 60,000 liters per day, and the requisite logistical facilities for the economic transport and storage of feedstocks and finished products.

In response to the request, the Japanese Government will dispatch a preliminary survey team from 8th to 17th December 1980, through the Japan International Cooperation Agency (hereinafter referred to as "JICA"), an official agency responsible for the Japanese Government, to carry out the preliminary survey for the THE STUDY ON THE NATIONAL ALCOGAS PROGRAM IN THE REPUBLIC OF THE PHILIPPINES (hereinafter referred as "THE STUDY").

## II. Objectives

The Japanese preliminary survey team (hereinafter referred to as "the TEAM") is expected to accomplish the following items by a field survey, and by exchanging views with the Philippine Government and the authorities concerned during its stay in the Philippines.

- (1) To clarify the contents of the request of the Philippine Government
- (2) To identify the fundamental conditions of the STUDY
- (3) To collect relevant information and data in the Philippines
- (4) To discuss "THE SCOPE OF WORK" for the STUDY, if the necessity is identified

## III. Information Required

The information required by the TEAM is largely divided into eight groups.

Among those eight groups, Group 1 and Group 2 are expected to be supplied by the Philippine counterparts, whereas from Group 3 to Group 7 will be the major themes for discussions between the two delegations and Group 8 will be studied by the TEAM with assistance from the Philippine counterparts.

Details of each group of information are described as follows:

1. Background Information

- (1) Importance and priority given to the PROGRAM in the national and sectoral economies
- (2) Problems involved in the PROGRAM
- (3) Effects of the PROGRAM, if it is advanced

2. Administrative Information

- (1) Names and activities of the Government Agencies and Offices of the Philippines which are responsible for and related to the promotion of the PROGRAM
- (2) Laws, regulations, institutions and other administrative matters related to the PROGRAM

3. Project Sites

- (1) natural environment
- (2) social and cultural environment
- (3) infrastructures
- (4) others

4. Raw Materials

- (1) current situation of agriculture
- (2) raw material selection
- (3) technologies for cultivation and harvesting
- (4) agricultural mechanization
- (5) potentiality of increase in raw material production in quality and quantity
- (6) water management
- (7) marketing
- (8) others



## 5. Alcohol Production

- (1) raw material procurement
- (2) pre-treatment
- (3) alcohol production technology
- (4) waste water treatment
- (5) plant equipments
- (6) production cost
- (7) factory management
- (8) training and education of factory workers
- (9) others

## 6. Distribution System, Storage, and Consumption

- (1) storage of alcohol
- (2) transportation of alcohol
- (3) blending of alcohol with gasoline for fuel consumption
- (4) due measures to stimulate alcohols as fuel for motor vehicles
- (5) others

## 7. Economic Aspects

- (1) raw material related matters
- (2) alcohol production related matters
- (3) logistics related matters

## 8. Supplements

- (1) Statistics of the related raw materials and alcohol product in the Philippines
- (2) Present level of the related technologies in the Philippines
- (3) Present situation of the related production in the field of agriculture and industries

- (4) Present or past experiences or practices of similar plans in public and/or private sectors
- (5) Others

The detailed items are referred to the Questionnaire in Appendix and the answers are expected to be provided before the arrival of the TEAM from the Philippines.

#### IV. Formulation of "THE SCOPE OF WORK"

"THE SCOPE OF WORK" will be formulated for the STUDY, if the necessity is identified, between the two delegations.

#### V. Collaboration by the Philippine Government

- (1) The Philippine Government will assign the staff for assisting the TEAM during its visit
- (2) The Philippine Government will arrange transportation facilities and an appropriate office room with necessary equipment for the TEAM
- (3) The Philippine Government will provide the TEAM with all information and data related to the PROGRAM

QUESTIONNAIRE

## TABLE OF CONTENTS

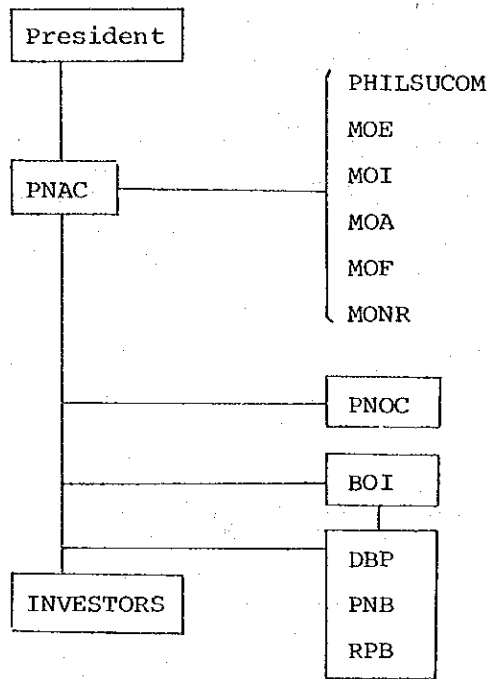
In answering the questionnaire, if you find the given answers are not enough, please comment on those.

- I. General
- II. Energy Policy
- III. Agricultural Policy and Production
- IV. The PROGRAM
- V. Project Sites
- VI. Raw Material Production
- VII. Factory Related Matters
- VIII. Technical Aspects of Alcohol Production and Waste Water Treatment
- IX. Distribution System and Storage
- X. Consumption of Alcohol
- XI. Economic Considerations

I. General

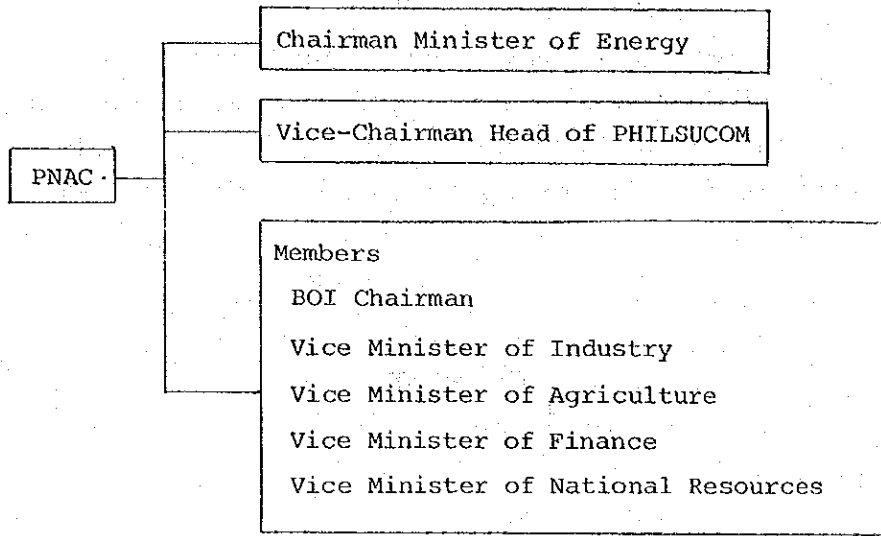
1. Institutions and Organizations related to the PROGRAM

(1) The TEAM understands the PROGRAM implementation institutions, the board of commissioners and organization of Philippine National Alcohol Commission (hereinafter referred to as "PNAC") as follows;

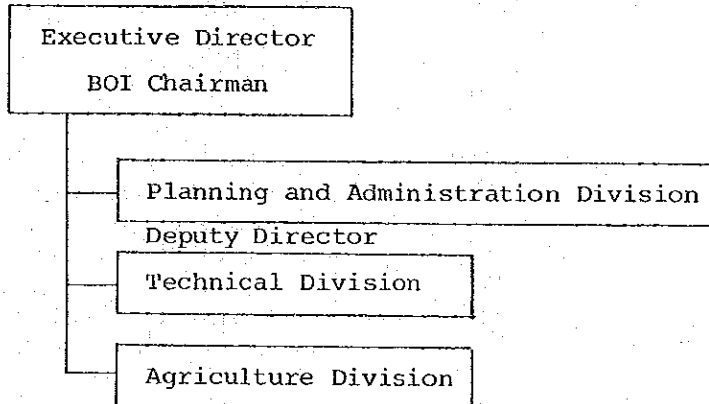


- |           |  |
|-----------|--|
| PNAC      | ... (Philippine National Alcohol Commission) |
| MOE       | ... Ministry of Energy                       |
| MOI       | ... Ministry of Industry                     |
| MOA       | ... Ministry of Agriculture                  |
| MOF       | ... Ministry of Finance                      |
| MONR      | ... Ministry of Natural Resources            |
| PNO       | ... Philippine National Oil Company          |
| BOI       | ... Board of Investment                      |
| DBP       | ... Development Bank of Philippines          |
| PNB       | ... Philippine National Bank                 |
| RPB       | ... Republic Planters Bank                   |
| PHILSUCOM | ... Philippine Sugar Commission              |

Board of Commissioners of PNAC



Organizational Chart of PNAC



Are these charts correct?

Yes

No

If not, please explain in detail in the preceding charts.

- (2) Please describe responsibilities and authorities of each member of PNAC.

- (3) Has Alcomgas Task Force of Philippine National Oil Company (hereinafter referred to as "PNOC") been succeeded by PNAC?

Yes

No

If so, in what degree?

2. The following expressions were found in your request and the report on Philippine Fuel Alcohol Program prepared by PNOC Alcogas Task Force.

- National Alcogas Program ..... NAP
- Philippine Fuel Alcohol Program ... PFAP
- the PNOC Alcogas Project ..... PNOC AP

(1) Based on our understanding, NAP would be the same as PFAP and PNOC AP.

Is our understanding correct?

Yes

No

If yes, hereinafter NAP, PFAP and PNOC AP are referred to as "the PROGRAM".

(2) If not, please explain the relationship and show us responsible institutions and organizations for implementing those programs.



3. For better comprehension of the request of the Philippine Government, the principle contents of the request should be clarified first. The TEAM understands that the primary contents of the request are as follows;

- 1) Raw materials
- 2) Project sites
- 3) Production of alcohol

Is the above correct?

Yes

No

II. Energy Policy

1. Is there any energy outlook or energy program authorized by the Government or the public institutions? If any,

- Name of Program

- Institutions

- Prospect of supply and demand

Please fill out Tables 1, 2, 3, 4, and 5.

2. Does the prospect shown above include the outcome of the PROGRAM?

Yes

No

If not, who supplies the amount of alcohol described in the above tables?

(Supplier: \_\_\_\_\_ )

3. It is a great help, if you show us, in chart organizations as well as authorities of the governmental institutions concerning the energy.

4. How about the laws and regulations on energy, in particular, on the PROGRAM?

5. Are there other programs for alternative energy resources development besides the PROGRAM?

Yes

No

If yes, name the programs and their present stages of progress.

Name	Present stage of the progress

Table 1 Demand of Primary Energy

Items	Year		1975	1977	1979	1980	1982	1985	1988	1990	1995
	Units										
Petroleum	million kl										
Coal	1,000 MT										
Hydroelectricity	1,000 kWh										
Nuclear	1,000 kWh										
Geothermal	1,000 kWh										
Wood Charcoal	1,000 MT										
Fuel Alcohol for gasoline engine diesel engine others	1,000 kl										

Table 2 Supply of Primary Energy

Items	Year		1975	1977	1979	1980	1982	1985	1988	1990	1995
	Units										
Petroleum	million kl										
Crude oil											
domestic											
import											
Products											
import											
Total											
Coal	1,000 MT										
Hydroelectricity	1,000 kWh										
Nuclear	1,000 kWh										
Geothermal	1,000 kWh										
Wood Charcoal	1,000 MT										
Fuel Alcohol	1,000 kl										

Table 3 Demand of Petroleum Products

(Unit: 1,000 kl)

Items	Year	1975	1977	1979	1980	1982	1985	1988	1990	1995
Gasoline *1										
Domestic										
Export										
Alcogas										
Jet fuel										
Domestic										
Export										
Diesel fuel										
Domestic										
Export										
Residual fuel										
Domestic										
Export										
Others										
Domestic										
Export										
Total										

Note: \*1 Excluding Alcogas

Table 4 Supply of Petroleum Products

(Unit: 1,000 KL)

Items	Year	1975	1977	1979	1980	1982	1985	1988	1990	1995
Gasoline *1										
Domestic										
Import										
Alcogas										
Jet fuel										
Domestic										
Import										
Kerosine										
Domestic										
Import										
Diesel fuel										
Domestic										
Import										
Residual fuel										
Domestic										
Import										
Total										

Note: \*1 Excluding Alcogas

Table 5 Imports of Petroleum and Petroleum Products

(Unit: million US dollars)

Items \ Year	1973	1975	1976	1977	1979	1980
Crude oil						
Product						
Total						



### III. Agricultural Policy and Production

Price level of agricultural products and their stable supplies are the key points to advance the PROGRAM. The production of raw materials for the PROGRAM should be kept in harmony with overall agricultural production and the agricultural policy.

Following questions are prepared to clarify the agricultural policy and the present condition of the agricultural production.

1. The Philippines has been a rice exporting country since 1978.

Has the Philippines achieved self-sufficiency in agricultural products?

Yes                      No

Please fill out Table 6, if data are available.

2. How about the roles of agriculture in the Philippine economy and the society?

Please fill out Tables 7, 8, and 9.

3. Is there a medium or a long term perspective of the agricultural production?

Yes                      No

If yes, indicate on the followings.

- name
- target year
- key figures in the target year

#### 4. The Agricultural Policy

- (1) Which crop has higher development priority?
- 1) rice
  - 2) maize
  - 3) sugarcane
  - 4) coconut
  - 5) cassava
  - 6) others ( )
- (2) Which region has higher priority in agricultural development?
- 1) Northern Luzon
  - 2) Central Luzon
  - 3) Southern Luzon
  - 4) Mindanao
  - 5) Mindro
  - 6) Other islands ( )

#### 5. Production by Crops

- (1) Sugarcane
- 1) Production and productivity  
Please fill out Tables 10 and 11.
  - 2) Constraints on the expansion of production and the improvement of productivity.  
What is the main constraint?  
From technical aspects
    - variety
    - irrigation
    - fertilizer
    - soil condition
    - pest and disease
    - others ( )

From economic aspects

- low price
- fluctuation of price
- others (            )

3) International sugar price fluctuates sharply.

Does the Philippine Government take any counter-measures to protect sugarcane producers, sugar refiners and consumers?

Yes

No

If yes, how does it work?

What is the role of the Philippine Sugar Committee (hereinafter referred to as "PHILSUCOM") in the counter-measure ?

4) Cropping pattern

How many months does it take to harvest sugar-cane after plantation? Show us a few typical harvesting patterns by regions by filling out the tables below.

Case 1 (Name of the region: \_\_\_\_\_ )

Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	
Plant Cane																					
Land Preparation																					
Planting																					
Harvest																					
Ratoon Cane																					
Ratooning																					
Harvest																					

Case 2 (Name of the region: \_\_\_\_\_ )

Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	
Plant Cane																					
Land Preparation																					
Planting																					
Harvest																					
Ratoon Cane																					
Ratooning																					
Harvest																					

Case 3 (Name of the region: )

Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A
Plant Cane																				
Land Preparation																				
Planting																				
Harvest																				
Ratoon Cane																				
Ratooning																				
Harvest																				

If farmers rotate sugarcane and other crops in the Philippines, please show us a typical rotation pattern.

Case 1 (Name of the region: )

Name of Crops	Sugarcane		Sugarcane
Period			

Case 2 (Name of the region: )

Name of Crops	Sugarcane		Sugarcane
Period			

Case 3 (Name of the region: )

Name of Crops	Sugarcane		Sugarcane
Period			

(2) Cassava

1) Production and Productivity

Please fill out Tables 12 and 13.

2) Is the Government promoting the production of cassava?

Yes

No

If no, what is the main reason?

- soil deterioration
- deforestation
- limited international market
- others ( )

If yes, what is the main constraint on the expansion of production?

- variety
- fertilizer
- soil condition
- pest and disease
- low price
- others ( )

(3) Sweet Potato

1) Production and Productivity

Please fill out Table 14.

2) Has the Government introduced high yield variety from foreign countries such as Japan?

Yes

No

If yes, how is the results?

6. Research Institutions

(1) Please list the agricultural research institutes.

(2) What kind of supports do you expect for the feedstock production from the above institutes?

- 1) breeding
- 2) plant nutrition
- 3) pest and disease control
- 4) mechanization (plantation, harvest, etc.)
- 5) water management
- 6) others ( )

7. What is the common fertilizer used in the Philippines?

Name:

(Component N. P. K)

Price: pesos/kg

Table 6 Self-Sufficiency

Items	Year	1965	1970	1975	1980	Target Year
						( )
Domestic Production (1,000 MT)						
Cereal						
Milk and Dairy Products						
Meat						
Vegetable and Fruits						
Feed						
Self-Sufficiency (%)		1965	1970	1975	1980	( )
Cereal						
Milk and Dairy Products						
Meat						
Vegetable and Fruits						
Feed						

Table 7 Agricultural Production in GNP

(Unit: thousand US dollars)

Items	Year	1965	1970	1975	1980	Target Year
						( )
Gross National Products						
Agricultural Sector						
Rice						
Maize						
Sugar Cane						
Coconut						
Others						



Table 8 Exports of Agricultural Products

Items	Year		1965	1970	1975	1977	1978	1979	1980	Target
	Units									Year
Total Exports		\$1,000 US								( )
Agricultural Commodities										
Copra	1,000 MT									
		\$1,000 US								
Sugar	1,000 MT									
		\$1,000 US								
Coconut Oil	1,000 MT									
		\$1,000 US								
Molasses	1,000 MT									
		\$1,000 US								
Others		\$1,000 US								

Table 9 Imports of Agricultural Products

Items	Year		1965	1970	1975	1977	1978	1979	1980	Target
	Units									Year
Total Imports		\$1,000 US								( )
Agricultural Commodities										
Cereals	1,000 MT									
		\$1,000 US								
Dairy Products	1,000 MT									
		\$1,000 US								
Feed	1,000 MT									
		\$1,000 US								
Others		\$1,000 US								

Table 10 Sugarcane Production

Items	Year	1965	1970	1975	1977	1978	1979	1980 (2000)
	Units							
Planted Area	1,000 ha.							
Harvested Area	1,000 ha.							
Sugarcane Production	1,000 MT							
Average Yield	MT/ha.							
Sugar Production (Raw & Centrifugal)	1,000 MT							
Molasses Production	1,000 MT							
Sugarcane Price	at factory							
Molasses Price	at factory							

Table 11 Yield Component in the Latest Year

Year				
Sugarcane Yield	ave.			t/ha.
	max.	at farmer's level		t/ha.
Cane Juice Yield	max.	%, ave.	%, min.	%
Sugar Yield	max.	ave.	min.	MT/ha.)
Molasses Yield	ave.			MT/ha.)
Bagasse Yield	ave.			(D.MT/ha.)
Fertilizer Application				
at Farmer's Level	kg/ha.	(N.	P.	K. kg/ha.)
Recommended	kg/ha.	(N.	P.	K. kg/ha.)

D.MT: Dry matters MT

N. : Nitrogen

P. : Phosphate

K. : Potassium

Table 12 Cassava Production

Items	Year	1965	1970	1975	1977	1978	1979	1980	(2000)
	Units								
Planted Area	1,000 ha.								
Harvested Area	1,000 ha.								
Cassava Production	1,000 MT								
Average Yield	MT/ha.								
Cassava Price	at factory								

Table 13 Yield Component in the Latest Year

Year					
Cassava Yield	ave.				MT/ha.
	max. at farmer's level				MT/ha.
Cassava Starch Yield	max. ave.				MT/ha.
Fertilizer Application					
at Farmer's Level	kg/ha.	(N.	P.	K.	kg/ha.)
Recommended	kg/ha.	(N.	P.	K.	kg/ha.)

Tabel 14 Sweet Potatoes

Items	Year	1965	1970	1975	1977	1978	1979	1980	(2000)
	Units								
Planted Area	1,000 ha.								
Harvested Area	1,000 ha.								
Sweet Potato Production	1,000 MT								
Average Yield	MT/ha.								
Sweet Potato Price									

IV. The PROGRAM

1. Please list institutions participated in the planning phase of the PROGRAM?

2. Which organization implements the PROGRAM?

(1) On Plantations to secure raw materials,

1) Which organization(s) is responsible for managing and maintaining the existing plantations?

Which organization(s) is in charge of expanding the existing plantations?

2) Is there any chance to develop new plantations by public or private sector? If so, please indicate.

(2) About alcohol producing plants

1) Is there any governmental institution? Please indicate it (them)?

2) How about private companies? Please indicate them.

3) If other types of organization exist, please indicate.

(3) Would you draw out in chart below the distribution system of alcohol in relation to blending with gasoline?

(4) Who is responsible for matters related to storing alcohol?

1) PNOC	Yes	No
2) Others		

3. On the PROGRAM by your government

(1) Provision of Raw Materials

1) What are the feestock crops envisaged in the PROGRAM?

What is the main raw material?

2) Please show us the annual production target for raw material by islands and overall, if any.

Table 15-1 Production Target of the Feedstock Crops

[Overall Total]

Items	Year		1980	1982	1985	1988	1990	1995
	Units							
Sugarcane	1,000 MT							
	1,000 ha.							
Cassava	1,000 MT							
	1,000 ha.							
Maize	1,000 MT							
	1,000 ha.							
Sweet Potato	1,000 MT							
	1,000 ha.							
Other ( )	1,000 MT							
	1,000 ha.							

Table 15-2 Production Target of the Feedstock Crops

[Luzon Island]

Items	Year		1980	1982	1985	1988	1990	1995
	Units							
Sugarcane	1,000 MT							
	1,000 ha.							
Cassava	1,000 MT							
	1,000 ha.							
Maize	1,000 MT							
	1,000 ha.							
Sweet Potato	1,000 MT							
	1,000 ha.							
Other ( )	1,000 MT							
	1,000 ha.							

Table 15-3 Production Target of Feedstock Crops

[Negros Island]

Items	Year		1980	1982	1985	1988	1990	1995
	Units							
Sugarcane	1,000 MT							
	1,000 ha.							
Cassava	1,000 MT							
	1,000 ha.							
Maize	1,000 MT							
	1,000 ha.							
Sweet Potato	1,000 MT							
	1,000 ha.							
Other ( )	1,000 MT							
	1,000 ha.							

Table 15-4 Production Target of the Feedstock Crops

[Mindanao Island]

Items	Year		1980	1982	1985	1988	1990	1995
	Units							
Sugarcane	1,000 MT							
	1,000 ha.							
Cassava	1,000 MT							
	1,000 ha.							
Maize	1,000 MT							
	1,000 ha.							
Sweet Potato	1,000 MT							
	1,000 ha.							
Other ( )	1,000 MT							
	1,000 ha.							

Table 15-5 Production Target of the Feedstock Crops

[Cebu Island]

Items	Year		1980	1982	1985	1988	1990	1995
	Units							
Sugarcane	1,000 MT							
	1,000 ha.							
Cassava	1,000 MT							
	1,000 ha.							
Maize	1,000 MT							
	1,000 ha.							
Sweet Potatoe	1,000 MT							
	1,000 ha.							
Other ( )	1,000 MT							
	1,000 ha.							



Table 15-6 Production Target of the Feedstock Crops

[Panay Island]

Items	Year	1980	1982	1985	1988	1990	1995
	Units						
Sugarcane	1,000 MT						
	1,000 ha.						
Cassava	1,000 MT						
	1,000 ha.						
Maize	1,000 MT						
	1,000 ha.						
Sweet Potato	1,000 MT						
	1,000 ha.						
Other ( )	1,000 MT						
	1,000 ha.						

How many hectares of production area will be required to meet the above? Please fill out Table 15. Also please prepare the same tables as the above for Bohol and Leyte Islands.

On each proposed site

3) How to achieve the targets? Mark below.

- a) Mainly by the development of new land for producing raw materials for alcohol production.
- b) Mainly by the conversion of existing fields into the fields specialized for producing raw materials for alcohol production.
- c) Mainly by the purchase at the market in other regions.

4) In case of developing the new land, which type of farm management is desired?

- a) a large-scale plantation farm under single management

- Who operates it?
- Government
  - Public cooperation
  - Private company
  - Farmers cooperative

b) a group of small farms managed by individual farmers.

5) In case of conversion, which type of farm management is desired?

a) the conversion in large scale by

- Government
- Public cooperation
- Private company
- Farmers cooperative

b) by individual farmers

(2) What are the annual production targets for alcohol?  
Please fill out the table below.

(Unit: 1,000 kl)

	1980	1981	1982	1983	1984	1985	1988	1990	1995
Alcohol									

(3) Usage of alcohol for motor vehicle

1) Do you intend to use neat alcohol instead of gasoline?

Yes

No

2) Do you try to produce alcogas which is mixture of 20% of alcohol and 80% of gasoline?

Yes

No

3) What are the bases of determining 20% as the blending ratio in the PROGRAM?

4) What is a desired octane level of alcogas?





4. Financial Aspects of the PROGRAM

(1) How to finance the various phases of the PROGRAM?

Comment on the following phases:

- 1) Material procurement
- 2) Factory construction
- 3) Factory operation
- 4) Logistics
- 5) R & D

(2) Do you have any incentive measure to stimulate financing the above phases?

- 1)
- 2)
- 3)
- 4)
- 5)
- 6) Others

## V. Project Sites

1. On each site, provide us with the necessary data on the followings, if available.

### (1) Natural condition

- 1) location, topography
- 2) situation of the surroundings
- 3) terrain of site
- 4) strength of the ground foundation
- 5) annual meteorological statistics (temperature, rainfall, etc.)
- 6) district map
- 7) hydrological condition
- 8) soil condition (structure and texture)
- 9) others

### (2) Social and cultural environments

- 1) number of houses and population densities
- 2) accommodations, schools, hospitals, religious buildings, amusement places, and stores
- 3) security measures
- 4) sanitation

### (3) Infrastructures

- 1) roads (paving, width)
- 2) electricity (voltage & cycles)
- 3) communication

4) harbors (what kind of ship is possible to use?  
( Tons)

5) possibility of utilizing river water for  
{ industries  
{ irrigation

6) irrigation facilities

7) transportation

8) others

(4) Other industries at each proposed site.  
Name the companies and show the present state.

Site 1

Name	Present State





(5) Agriculture

1) present land use

Total area	(	ha.)
cultivated area	(	ha.)
rice	(	ha.)
maize	(	ha.)
sugarcane	(	ha.)
cassave	(	ha.)
vegetable and fruits	(	ha.)
others	(	ha.)
forests and woodland	(	ha.)
unused and wasteland	(	ha.)
others (roads, ditches, houses, rivers, etc.)	(	ha.)

2) land ownership

land cultivated by landowners	(	ha.)
land cultivated by tenants	(	ha.)
(land rent		pesos/year)

3) number of farmers

owner cultivators  
tenants

4) number of labor

year round	average wages	(	pesos/year)
seasonal	average wages	(	pesos/year)

5) annual income per family

Total	(	pesos/year)
agriculture	(	pesos/year)
other sector	(	pesos/year)

6) agricultural machineries

four wheel tractors

hand tractors

sprayers

harvesters

2. On each proposed site, do you have any specific idea about the place to locate refineries, shipping terminals and service stations? How about the present conditions of these places, if they are planned. Please indicate.

3. Indicate your perspectives of securing factory workers.

VI. Raw Material Production

1. Various social and economic effects would be foreseen with the use of agricultural products for ethanol production. How does the Government assess those influences and effects of the PROGRAM, especially on the agricultural sector?

Please describe on the following points.

Items		
<ul style="list-style-type: none"> <li>- rural development</li> <li>- standard of living income education cultural aspect</li> <li>- opportunities for employment</li> <li>- environmental protection</li> <li>- competition with other crops</li> <li>- sugar price</li> <li>- sugar production</li> <li>- sugar export</li> </ul>		

2. Does not the PROGRAM contradict with the policy of self-support of foods?

(1) No contradiction because foods are self-supported at present.

Yes

No

- (2) It may raise a problem in the future, considering population growth.

Yes                      No

- (3) Scope of the PROGRAM can well be accomplished by the expansion of new agricultural land in the future.

Yes                      No

3. Considering comparative importance of agriculture in the Philippine economy and in foreign trade, the PROGRAM may deteriorate the present situation of agriculture in the Philippines. What is your opinion on this point?

- (1) No problem because new expansion of land for agriculture is possible.

Yes                      No

- (2) Land for agriculture to be expanded will be in remote places where much investment and time are required to develop, and will not be easy as planned.

Yes                      No

4. The productions and prices of raw materials tend to vary depending on the weather conditions.

- (1) In short run, the constant supply is possible regardless of weather change, because the Philippines consist of many islands and weather condition vary from island to island.

Yes                      No

(2) In long run, it will not be a big problem, if new farm lands are developed such as Mindanao Islands are developed?

Yes

No

5. Prices of agricultural products are largely affected by overseas production.

(1) Do you have any particular countermeasure to stabilize the prices?

- (2) Please provide price change data concerning the prime agricultural products in the Philippines, such as rice, sugarcane, maize, coconut oil, etc. (for the past 20 years)



6. Is there a coordinating body to harmonize the feedstock production with the agricultural production?

Yes                      No                      under consideration

More specifically how does PHILSUCOM conceive this point?

Is there any specific plans? How about other bodies?

7. Is there any criteria to demarcate feedstock production area from agricultural production area?

Yes                      No

If yes, what is it?

8. Does the Government have any intension to utilize the fuel ethanol production as a means to adjust the price falls due to the over production?

Yes                      No

VII. Factory Related Matters

1. The extent of the factory in your project

(1) Do you consider such facilities as school, hospital, church, market, road, bridge, etc., in your planning?

Yes                      No

(2) Some factory location may call for such infrastructures as harbor facilities. Are they being considered?

Yes                      No

2. Do you include self-supporting facilities such as industrial water, electricity and others in your factory planning?

Yes                      No

3. To what extent are the materials needed for factory construction, available indigenously in the Philippines? Comment on procurability of those.

(1) Construction materials such as:

cement	Yes	No
concrete piles	Yes	No

gravel	Yes	No
others		

(2) Plant equipments

Tank materials	Yes	No
Pipings	Yes	No
Distillation columns (stainless steel)	Yes	No
Heat exchanger	Yes	No
Motors	Yes	No
Instrumentation	Yes	No
Boilers	Yes	No
Generators	Yes	No
Others ( )		

(3) Please indicate the legal and taxation restrictions against the materials and equipments brought in from overseas for constructing the factory, if any.

4. To what extent are plant contractors capable of plant design and construction?

(1) Up to basic design	Yes	No
(2) Up to detailed design	Yes	No
(3) Completely including implementation design	Yes	No

- |     |  |     |    |
|-----|--|-----|----|
| (4) | From basic design,<br>through completion of<br>work to test runs | Yes | No |
| (5) | Up to establishment<br>of plant                                  | Yes | No |
| (6) | Otherwise  | Yes | No |

5. The factory construction expenses and operating costs depend on laws and regulations concerning safety, sanitary and environmental pollutions and the actual state of their enforcement, especially, laws and regulations concerning environmental pollutions. Effects will be considerable especially when the present regulations are enforced as they are.

Do you intend to enforce the present laws and regulations at the proposed site?

Yes

No

6. To what degree can the public communication systems be utilized?

- |               |     |    |
|---------------|-----|----|
| ex. Telephone | Yes | No |
| Telegram      | Yes | No |
| Telex         | Yes | No |
| Fax.          | Yes | No |
| Others        |     |    |

7. Well trained technicians are required to secure plant operations. How do you train them?

- (1) By training in existing factories
- (2) Gradual training with assistance from overseas
- (3) Otherwise

8. What are your plans for maintenance and facilities for plant?

9. What will be the capacity of the factory?

- (1) 60,000 liter/day
- (2) Otherwise

10. How about working days?

- (1) 6 months/year
- (2) Over 300 days/year
- (3) Otherwise \_\_\_\_\_ days

How much do you plan to produce alcohol monthly?

( \_\_\_\_\_ kl/month)

11. What are your views on automation?

- (1) Less automation and more workers
- (2) Automatic operation as much as possible

12. Operating conditions of plant

- (1) Will raw materials be fed constantly throughout 24 hours, with the capacity of boilers and generators to match?

Yes No

- (2) Will raw materials be fed only in daytime?

Yes No

13. On storage of product alcohol

- (1) Will the site for storage be at production factory for stabilized supply?

Yes No

- (2) Or, will storage be by the consumers' side near enough for the consumption?

Yes No

- (3) On both sites

Yes No

14. Can you utilize the state-owned land as the factory site?

Yes

No

In case that the proposed site is privately owned, what are your measures to establish the factory? Will it be land lent? Comment.

15. List main contractors (top ten)

(1)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

VIII. Technical Aspects of Alcohol Production and Waste Water Treatment

1. Technology of Alcohol Production

(1) Are analytical data on components of raw materials for alcohol fermentation available? Circle the adequate answer below.

- 1) available
- 2) not satisfactory
- 3) unavailable

(2) On pre-treatment of raw material

1) Is sufficient pre-treatment necessary?

Yes                      No

2) Pre-treatment is not under consideration for the purpose of simplification of process

Yes                      No

3) Comment on pre-treatment

(3) Are the conditions for mashing and ripening already decided?

Yes                      No

1) Show the mashing condition for sugar concentration.

(                                      w/v%                                      )

2) Composition of mash in alcohol at ripening.

(                                      %)



(4) Have the conditions for the mash control already been decided?

Temperature ( °C)

Time period of fermentation ( hr.)

(5) On fermentation process, which of the below will be adopted?

- 1) batch system
- 2) continuation process
- 3) yeast recycling system

(6) Product specification of alcohol

1) Will only organic acid and alcohol content be checked as practiced in Brazil?

Yes No

2) Are other specifications considered?

Yes No

If so, indicate the specifications.

2. On Waste Water Treatment

(1) Indicate laws and regulations for pollution control

Name of laws and regulations

Items	pH	COD	BOD <sub>5</sub>	SS	Heavy Metal	Others
Level						

COD : Chemical Oxygen Demand  
( KMNO<sub>4</sub> Method)

BOD<sub>5</sub> : Biological Oxygen Demand  
5 days at 20°C

SS : Suspend Solid

(2) Show other measures for environmental protection, if any.

(3) Which waste water treatment will be adopted when pollution control and economic factors are considered?

- |                             |     |    |
|-----------------------------|-----|----|
| 1) lagoon                   | Yes | No |
| 2) methane fermentation     | Yes | No |
| 3) activated sludge process | Yes | No |
| 4) condensation             | Yes | No |
| 5) others                   |     |    |

3. How are the plans to dispose of the surplus bagasse in case that sugacane is used as the raw material?

IX. Distribution System and Storage

1. General

(1) Impact of the PROGRAM on petroleum products

If large amounts of alcohol could be produced and be blended into gasoline, and large parts of petroleum products have been supplied by domestic refineries, there would be some quantity of surplus gasoline.

1) How do you plan to deal with surplus gasoline?

Export gasoline to foreign countries

Yes No

Decrease crude oil supply processed in refineries

Yes No

2) If you will decrease crude oil supply to meet gasoline demand, there would be shortage of other fractions. How do you plan to cope with the problems?

Will any product in shortage be imported?

Kerosine	Yes	No
Diesel fuel	Yes	No
Residual fuel	Yes	No

Otherwise (if not imported), what measures will be adopted to secure supply for kerosine, diesel and residual fuel?

Kerosine

Diesel fuel

Residual fuel

(2) Role of PNOC on the PROGRAM

If PNOC has been selling all petroleum products in the Philippines, alcogas can be supplied over the country. However, if some percentages of products have been sold by other companies, it would not be easy to market alcogas all over the country.

1) How much percentages of products have been sold by PNOC?

(           %)

2) If not 100%, how do you get other companies to take part in the PROGRAM?

By legislations	Yes	No
-----------------	-----	----

By a volunteer action	Yes	No
-----------------------	-----	----

2. Refinery

Describe on the following items:

(1) Locations

(2) Capacities of facilities

Topping	(	kl/d)	
Reformer	(	kl/d)	
FCC*	(	kl/d)	*Fluid Catalytic Cracking
Hydro-treator	(	kl/d)	

(3) Gasoline blending and storage

1) Process of blending

( Line or Tank )

2) Number of tanks and their volume

No. \_\_\_\_\_

Vol. \_\_\_\_\_ 1,000 kl

Capacity of each tank \_\_\_\_\_ kl

3) Amount of gasoline formulated per day

( kl/d)

4) Shape of tank

( Floating or Cornroof )

5) Device for preventing water penetration into tank

6) Fire extinguishing system.

7) Material of tank

(4) Do refineries have the same activities as delivery terminal (D/T)?

Yes

No

If so, describe in relation to the question 5 in this section.

3. Gasoline quality

(1) Kinds of gasoline being marketed

( Premium, Regular, Unleaded, Others )

(2) Their qualities

Specific gravity (15°C/4°C) ( g/ml)

Octane number (F-1) ( )

Vapor pressure ( kg/cm<sup>2</sup>)

Lead content ( wt%)

Distillation test

IBP ( °C)

10% ( °C)

50% ( °C)

90% ( °C)

97% ( °C)

Total distillate ( Vol %)

Residue ( Vol %)

4. Delivery from refinery to delivery terminal

- (1) Methods of delivery  
( Boat, Pipe line, Truck, Tank-lorry, Others )
- (2) Amount of gasoline delivered by each method  
( kl/d)
- (3) Pipe line networks, if any.
  - 1) Number
  - 2) Each diameter ( cm)
  - 3) Each distance ( km)
  - 4) Material
  - 5) Delivery cost ( cents US/kl)

5. Delivery terminals

- (1) Their location
- (2) Their storage capacities ( kl)  
Number of tanks ( )  
Capacity of each tank ( kl)
- (3) Shape of tank  
( Floating or Cornroof )
- (4) Amount of gasoline handled per day ( kl/d)  
Loading capacity ( kl/d)

- (5) Blending facilities, if any  
 ( Tank blending, Separate loading into tank-lorry,  
 Others )  
 Blending capacity ( kl/d)
- (6) Material of storage tank, blending facilities and  
 their accessories.
- (7) Fire extinguishing system
- (8) Receiving facilities and its capacity  
 ( kl/d)
- (9) Wage of a labourer ( cents US/d)
- (10) Delivery cost to service station ( cents US/kl)
- (11) Extra tanks available for storage of alcohol and  
 gasoline  
 Number of tanks ( kl)  
 Volume per tank ( kl)

6. Service Stations

- (1) Storage capacity (total kl)  
 Number of tanks ( )  
 Volume per each tank ( kl)



- (2) Sales amount of gasoline per day (                      kl/d)
- (3) Number of fueling pumps                      (                      )
- (4) Shape and position of vent equipped to underground tank
- (5) Materials of tank, fueling pump and their accessories
- (6) Wage of a labourer                      (                      dollars US/d)
- (7) Device for preventing water penetration into underground tank

7. Alcohol Production Facilities

- (1) Distance from refinery and/or D/T  
(                      km)
- (2) Delivery method to refinery and/or D/T  
( Pipe line, Tank-lorry, Others )
- (3) Shape of storage tank  
( Floating or Cornroof )
- (4) Capacity of extra tank for storage  
Number of tanks                      (                      )  
Volume per tank                      (                      kl)

8. Alcogas

(1) Site of blending alcohol with gasoline

( Refinery, D/T, Others )

(2) Kinds of gasoline when alcogas appears

How many? ( )

What kind? ( )

(3) Estimated alcogas quality

Their qualities

Specific gravity (15°C/4°C) ( g/ml)

Octane number (F-1) ( )

Vapor pressure ( kg/cm<sup>2</sup>)

Lead content ( wt%)

Distillation test

IBP ( °C)

10% ( °C)

50% ( °C)

90% ( °C)

97% ( °C)

Total distillate ( Vol %)

Residue ( Vol %)

9. Price and tax

(1) Statistics of gasoline and diesel fuel price in  
the past five years ( cents US/l)

(2) Tax of gasoline, alcogas and diesel oil

(                      cents US/l)

(3) Tax of alcohol blended into gasoline

(                      cents US/l)

X. Consumption of Alcohol

1. How is the condition of possessing motor vehicles in the republic of the Philippines? Complete the table below by islands.

(Unit: 1,000)

Islands	Types of Motor Vehicles	Gasoline	Diesel Fuel
Luzon	Passenger Cars		
	Trucks		
	Motor Cycles		
Negros	Passenger Cars		
	Trucks		
	Motor Cycles		
Mindanao	Passenger Cars		
	Trucks		
	Motor Cycles		
Cebu	Passenger Cars		
	Trucks		
	Motor Cycles		
Panay	Passenger Cars		
	Trucks		
	Motor Cycles		

Also please mention on the same matter for Bohol and Leyte Islands.

2. How is the amount of motor vehicle fuel used in the Republic of the Philippines? Complete the table by islands.



4. How are the cooperating conditions of automobile manufacturers for alcogas cars? Circle the below and comment.

Excellent

Fair

Poor

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5. Have there been any evaluation test and research of motor vehicles using alcohol? Indicate them.

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If you have the experience, what are the names of the evaluations and research organizations or the manufacturers?

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Also, how are the outlines of evaluations.

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6. How do you foresee the effects on the motor vehicles when alcogas is actually used for motor vehicles?

In particular, what are the effects on the fuel supply system of the evaluation such as; fuel hose, fuel filter, etc.?

Fuel hose  
Fuel filter  
Fuel pump  
Others

7. If any trouble occurs as a result of usage of alcogas what kind of the guarantees and a security measures are assumed? Who are responsible to the above?

Kinds of guarantees & security measures:

Responsible bodies:

8. Alcogas has been used in Negros Island, How about users' evaluation on alcogas?

9. What are the kinds and degree of troubles in motor vehicles resulting from using alcohol as fuel in Negros Island?

Kinds:

Degree:



XI. Economic Considerations

1. What are your estimations for the production cost and sales price of alcohol when the production starts?

2. There would be considerable difference between price of alcohol and price of gasoline. How to cope with it?

(1) By subsidy? For example, present gasoline tax as the source of subsidy?

Yes

No

(2) Possibility of narrowing the gap between price of alcogas and that of gasoline by the time of actual production of alcohol.

Yes

No

(3) What are the likely measures to be adopted to narrow the gap?

3. Are you considering differentiated taxation between alcogas and gasoline?

Yes No

4. In Brazil, the Government determines the selling and buying price of sugar cane as well as parity price of alcohol to be purchased. Are similar administrative measures being studied in the Philippines?

Yes No

5. Produced alcohol is purchased by the Government in Brazil. Does the Philippine Government guarantee the purchase?

Yes No

6. Does the purchase of alcohol start with the production?

Yes No

7. Philsucom's plan is to utilize sugar cane from existing farm land and to construct alcohol factory next to sugar factory. Alcohol production from a new plantation may result in considerably high production cost. What are the measures to meet the cost difference?

8. If fuel alcohol production has already started under the PROGRAM, provide us with the following informations.

(1) Raw material

(2) Annual alcohol production ( kl/year)

(3) Amount of raw material needed ( MT/year)

(4) Cost of alcogas ( dollars US/l)

component of the cost

(5) Tax and subsidy

(6) Price of alcogas

### Ⅲ 資 料 リ ス ト

資 料 名	出 所
1. ALCOGAS PROGRAM	PNAC
2. General Description of the Dasmariñas Cavite Area	PNAC
3. Five-Year Energy Program 1981-1985	MOE
4. Ten-Year Energy Program 1980-1989	MOE
5. Questionnaire の Energy Policy に対する解答 及び関連法規	MOE
6. レギュラー&プレミアムガソリンの Specification	PNOC
7. 環境規制について 水質規定(基準) 廃棄物排出基準 悪臭排出基準	
8. Executive Order No. 580	PNAC
9. Raw & Refined Sugar Manufacture Flow Diagram	Philsucom
10. The Victorias Mill District; Description of Area	MOA
11. Growing Cassava in the Philippines	MOA
12. Sweet Potato Culture in the Philippines	MOA
13. Wholesale Prices of Primary Ag Products	PNPC
14. ALCOHOL PRICE BREAKDOWN アルコール価格構成表	PNOC
15. CAPACITIES OF REFINERIES	PNOC
16. TYPICAL SPECIFICATIONS OF ALCOGAS	PNOC
17. HISTORY OF REFINED PETROLEUM PRODUCT PRICE	PNOC
18. Statistical Data on Motor Vehicle Registration (車登録台数 1976 と 1978)	PNOC

- |     |   |               |
|-----|---|---------------|
| 19. | Laws and Regulations to the Energy Program<br>in the Republic of Philippines  | MOE           |
|     | - Presidential Decree No. 1206<br>"Creating the Department of Energy"   |               |
|     | - Presidential Decree No. 87<br>"To Promote the Discovery and<br>Indigenous Petroleum, and Appropriating<br>Appropriating Funds Therefor"             |               |
|     | - Presidential Decree No. 972<br>"Promulgating an Act to Promote an Accelerated<br>Exploration, Development, Exploitation and<br>Utilization of Coal" |               |
|     | - Presidential Decree No. 1442<br>"An Act to Promote the Exploration and<br>Development of Geothermal Resources"                                      |               |
| 20. | Philippine Statistical Year Book 1980   | NEDA          |
| 21. | Philippine Development Report 1979  | NEDA          |
|     | Sugarcane Production in Asia 1980   | APO           |
| 23. | The Philippines Recommends for Irrigation Water<br>Management 1978, Vol. 1 Lowland Rice Conditions  | PCARR         |
| 24. | The Philippines Recommends for Soil Fertility<br>Management 1979  | PCARR         |
| 25. | Status of Pilot Cassava Feed Project in Bohol<br>(As of August 1980-1st year operation)   | MOA           |
| 26. | Introduction and Trial Planting of Sweet Potato<br>Varieties from Japan   | MOA           |
| 27. | Estimated Cost of Production per Hectare of<br>Sweet Potato   | MOA           |
| 28. | Cassava : Estimated Cost of Production per Hectare  | DBP Estimates |
| 29. | Tables on Cassava Production  | BPI           |

- |     |  |          |
|-----|--|----------|
| 30. | Ten-Year Sweet Potato Program  | BPI      |
| 31. | Tables on Sweet-Potato Production  | BPI      |
| 32. | Ten-Year Rootcrops   | BPI      |
| 33. | Sugar Cane: Area, Production and Yield<br>Per Hectare by Municipality, Crop Year 1979    | MOA, BAE |
| 34. | Cassava: Area, Production and Yield<br>Per Hectare by Municipality, Crop Year 1979       | MOA, BAE |
| 35. | Satsuma Imo Project, Operating Expenses for<br>both Tuber and Vince Cutting Propagation  | BPI      |
| 36. | Agricultural Land Utilization and Production<br>Targets 1980-1985 and 1990 Root Crops    | MOA      |
| 37. | Sweet Potatos Propagation Data   | BPI      |
| 38. | Soil Testing Data and Fertilizer<br>Recommendation Soils Region No.4 Manila              | MOA      |
| 39. | Trial Planting and Multiplication Project<br>Three Japanese Giant Sweet Potato Varieties | MOA      |

地図・グラフ

- |  |       |
|--|-------|
| - Agroclimatic Map of the Philippines<br>1/2,500,000   | IRRI  |
| - Soil Texture Map of the Philippines  | PCARR |
| - Monthly Rainfall and Cyclones in the Philippines   | PCARR |
| - Rainfall Patterns in the Philippines<br>During Occurrences of Tropical Cyclones<br>(15 years record) | PCARR |

統計資料

- |  |
|--|
| - Philippine Agriculture Fact Book and Buyers' Guide |
|--|

地 形 図

- 1/1,500,000

- 1/ 250,000

- 1/ 50,000

PHILLIPPINES

MANILA (カビテ用)

CEBU CITY (ボホール用)

BAY BAY (レイテ用)

KABASALAN (ミンダナオ用)

PANDAN

LUCENA CITY

LEGAZPI CITY

DAET

3162 I } CAVITE

3162 IV }

3161 IV }

3161 I } LUZON

3163 II }

3162 III BATANGAS

#### IV 面談者リスト

##### PHILIPPINE NATIONAL ALCOHOL COMMISSION (PNAC)

##### --- First Plenary Meeting ---

Gov. ZAYCO, H. C.	PNAC-B01, Executive Director
Dr. ROSARIO, E. L.	PNAC (UPLB), Deputy Director and Chief Agricultural Service
Mr. BALCE, N.	PNAC (PNOC-AC)
Dr. CAMURUNCAN, R. C.	PILSUCOM, Deputy Executive Officer and Director
Mr. JAYME, F.	MOA, Energy Crops Consultant
Ms. SILVA, O. C.	MOE, Planning Service
Ms. LACOS, J.	PNAC (PNOC-AC), Economist, Planning and Administration
Mr. ESPIRITU, D. H.	PNAC, (PNOC-AC), Planning and Administration
Mr. ANTONIO, E. M.	PNAC, (PHILSUCOM), Industrial Services
Mr. FORTUNO, A.	PNAC, (PNOC-AC), Industrial Services



PHILIPPINE NATIONAL ALCOHOL COMMISSION (PNAC)

--- Second Plenary Meeting ---

Dr. ROSARIO, E. L.	PNAC (UPLB), Deputy Director and Chief, Agricultural Service
Mr. BALCE, N.	PNAC (PNOC-AC), Chief, Industrial Service
Mr. JAYME, F.	MOA, Energy Crops Consultant
Ms. SILVA, C. C.	MOE, Planning Service
Mr. REGUMAY, P.	MONR, Planning Service
Ms. LAGOS, J.	PNAC (PNOC-AC), Economist, Planning and Administration
Mr. ESPIRITU, D. H.	PNAC (PNOC-AC), Planning and Administration
Mr. ANTONIO, E. M.	PNAC (PHILSUCOM), Industrial Services
Mr. FORTUNO, A.	PNAC (PMOC-AC), Industrial Services
Ms. OCAMPO, E. P.	PHILSUCOM, Chemical Engineer
Ms. SALCEDO, F. G.	PHILSUCOM, Sugar Technologist
Mr. VENTIGAN, N.	PNAC (PNOC-AC), Industrial Services

VICTORIAS MILLING COMPANY

Victorias Milling Co. Inc.  
Vicmico, Negros, Occidental 6037  
Philippines

Mr. EALA, F. C.	Executive Vice President
Mr. LUZURIAGA Sr., E.	Vice President, VMC Alcogas Project Chairman
Mr. TIANCO, A.	Director, Research Agriculture
Mr. FLORCRUZ, N.	Alcogas Coordinator
Mr. HUELE, J.	Superintendent, Engineering Division
Mr. ABRILLE, L. V.	Energy Superintendent
Mr. TUANO, D.	Staff Assistant to Vice President Manufacturing
Mr. DEYPACAN, R.	Alcogas Distillery Superintendent

PHILIPPINE AGRICULTURAL COMMISSION INSTITUTE

(Research and Development)

Mr. MERCADO, F. E.	Director, Department of Agricultural Engineering
Mr. PALMARES, R. S.	Chief, Research and Development
Mr. COSILO, L.	Chief Agronomist
Mr. ZATAGUZA, B. V.	Sugarcane Breeder
Mr. BOMBIO, I. S.	Agronomist
Mr. ATIENZA, C. S.	Plant Pathologist
Mr. OALA, F. T.	Consultant (Breeding)
Mr. TAPAY, R.	Agronomist
Mr. DOSAM, V.	Agronomist
Mr. QUILLOY, O. T.	Soil Technologist

PHILIPPINE SUGAR COMMISSION (PHILSUCOM)

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COL. FANDIALAN, J. C.	Technical Consultant
Mr. HIZOR, L. S.	Deputy Sugar Process Engineer
Ms. OCAMPO, E. P.	Deputy Sugar Process Engineer
Ms. SALCEDO, F. G.	Technical Specialist

MINISTRY OF AGRICULTURE

Mr. JAYME, F.	Energy Crops Consultant Management Staff
Mr. EVANGEVSTA, P.	Soil Technologist, Bureau of Soils
Mr. CACHO, E.	Senior Pathologist, Root Crops Division, Bureau of Plant Industry
Mr. CABALLERO, B.	Chief, Seed Production Division, Bureau of Plant Industry
Mr. AQUINO, C.	Agronomist and Root Crops Coordinator, National Food and Agriculture Council
Mr. ABASTILLAS, E.	Assistant Energy Crops Consultant Management Staff





JICA