

(CONTINUED)

SPECIFIC ITEMS	YEAR	PERFORMANCE FROM THE INITIATING OF THE PROJECT TO DEC., 1985	RESULT OF PRE-EVALUATION	ANNUAL WORK PLAN FROM JAN. TO OCT., 1986 BY JAPANESE SIDE	FINAL EVALUATION
Methane fermentation of distillery waste	1983 - 1985	* Beaker test was carried out by STE. * LTE continues the experiment.	* Experimental method was completely transferred to C/P.	* Provision of Methane Fermentor (100 l) * Dispatch of STE (1 month)	Technology for methanation of the fermentation of distillery waste was transferred to Indonesia.
Survey and screening of liquefying and saccharifying enzyme producing microbe	1983 - 1985	* Beaker test and guidance of experimental method were carried out by STE. * LTE conducted the continuous research.	* Experimental method of screening was completely transferred to C/P.	* LTE should give advice to the Indonesian side if necessary.	A new strain which produced more amylase than standard strain was isolated and identified as Aspergillus species.
Aerobic treatment of effluent after methane fermentation.	1984 - 1985	* Continuous experiment has been carried out with 2 l jar-fermentor by LTE.	* C/P acquired the basic technique of aerobic treatment.	* Scale up test with Methane Fermentor to be provided by JICA	Technology transfer for aerobic treatment of effluent after methane fermentation has been carried out.
Low-temperature cooling process (70 - 90 C)	1983	* Basic experiment with 30 l jar-fermentor was carried out by STE.	* Technical transfer of labo-level has been already done.		Standardization for the operation of low temperature cooking and fermentation process was established.
Improvement of microbe strain	1985	* STE made an experiment for improvement of microbe strain by the method of irradiation of ultra-violet ray	* Experimental method was completely transferred to C/P	* LTE should give advice to the Indonesian side if necessary.	C/P acquired the technique for the improvement of microbes by mutation such as ultra-violet ray irradiation.
Determination of the optimum condition for liquifying, saccharifying and fermentation of other raw material (Sago-palm, Nipa-palm etc)		not yet tried.	(Comments)	* This item of research for sago is being conducted at the research center in Serpong. * Accordingly, this item must be eliminated in future.	The elimination of this item from study programme was understood mutually.

(Signature)

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(CONTINUED)

SPECIFIC ITEMS	YEAR	PERFORMANCE FROM THE BEGINNING OF THE PROJECT TO DATE, 1985	RESULT OF PRE-EVALUATION	ANNUAL WORK PLAN FROM JAN. TO OCT., 1986 BY JAPANESE SIDE	FINAL EVALUATION
i Submerged culture of liquifying and saccharifying enzyme producing microbe.	1985	* Culture research was conducted with 200 l jar-fermentor by 2 STE.	* Technical transfer of 200 l jar-fermentor operation was finished.	* Research continuously.	-For enzyme production, optimum medium composition and culture condition of new strain which was selected and named as Stillage no.1 were settled with 30 l jar-fermentor, and then enzyme production was tested with 200 l jar-fermentor.
j Basic research on cellulose saccharifying process.	1985 - 1986	* Experimental guidance was carried out by STE (Screening of cellulose producing fungi)	* C/P acquired the basic experimental method.	* Dispatch of STE (1 month)	-Effect of cellulosytic and pectinolytic enzyme on saccharification of cassava and other cellulosic material was studied.
k Continuous fermentation by conventional process and immobilized yeast process.	1986	not yet tried.	* Dispatch of STE (1 or 2 months)		-Technology for continuous fermentation by conventional process and immobilized yeast process were completely transferred to C/P.
l Non-cooking process	1985 - 1986	* Basic experiments with 30 l jar-fermentor was carried out by STE.	* Experimental guidance was completely done.	* Scale up test with 200 l jar-fermentor by STE.	- Scale up test of non-cooking process with 200 l jar fermentor is scheduled in the course of cooperation.
m Processing					
n Confirmation of technical standard in pilot plant	1983 - 1986	* LIT and STE instructed a series of operation system of the pilot plant.	* C/P and operators fully mastered standard operation procedure of pilot plant.	* LIE should give advice to the Indonesian side if necessary.	- Making out the operation schedule of pilot plant. - Standard operation procedure of the pilot plant satisfactorily.

(12)

(CONTINUED)

SPECIFIC ITEMS	YEAR	PERFORMANCE FROM THE BEGINNING OF THE PROJECT TO DEC., 1985	RESULT OF PRE-EVALUATION	ANNUAL WORK PLAN FROM JAN. TO OCT., 1986 BY JAPANESE SIDE	FINAL EVALUATION BY INDONESIAN SIDE
b Low-temperature cooking process (70 - 90 C)	1984	* Low-temperature cooking process was tried in the 11th test run.	* Possibility of low temperature cooking process in the plant was confirmed.	- ditto - * Making out test plan of the process.	-Intrough the stage of laboratory test with jar-fermentor, low temperature cooking process was successfully done with the pilot plant at the 11th test run.
c Fermentation of other raw material (Sago-palm, Nipa-palm etc)		not yet tried.		* (comment) In Japan, there is no experience to use those materials. Accordingly, this item of technical cooperation must be eliminated in future.	-This item was eliminated with mutual understandings.
d Non-cooking process	1986	not yet tried.		* Scale-up test with 200 l jar-fermentor by IFE.	-This item was eliminated to the same subject in basic research with mutual understanding.
e Methane fermentation of distillery waste	1986	not yet tried.		* Provision of methane fermentor (100 l) * Dispatch of SIE (1 month) * Preparation of utility (electricity, water, drainage and so on).	-ditto-

*Mc*

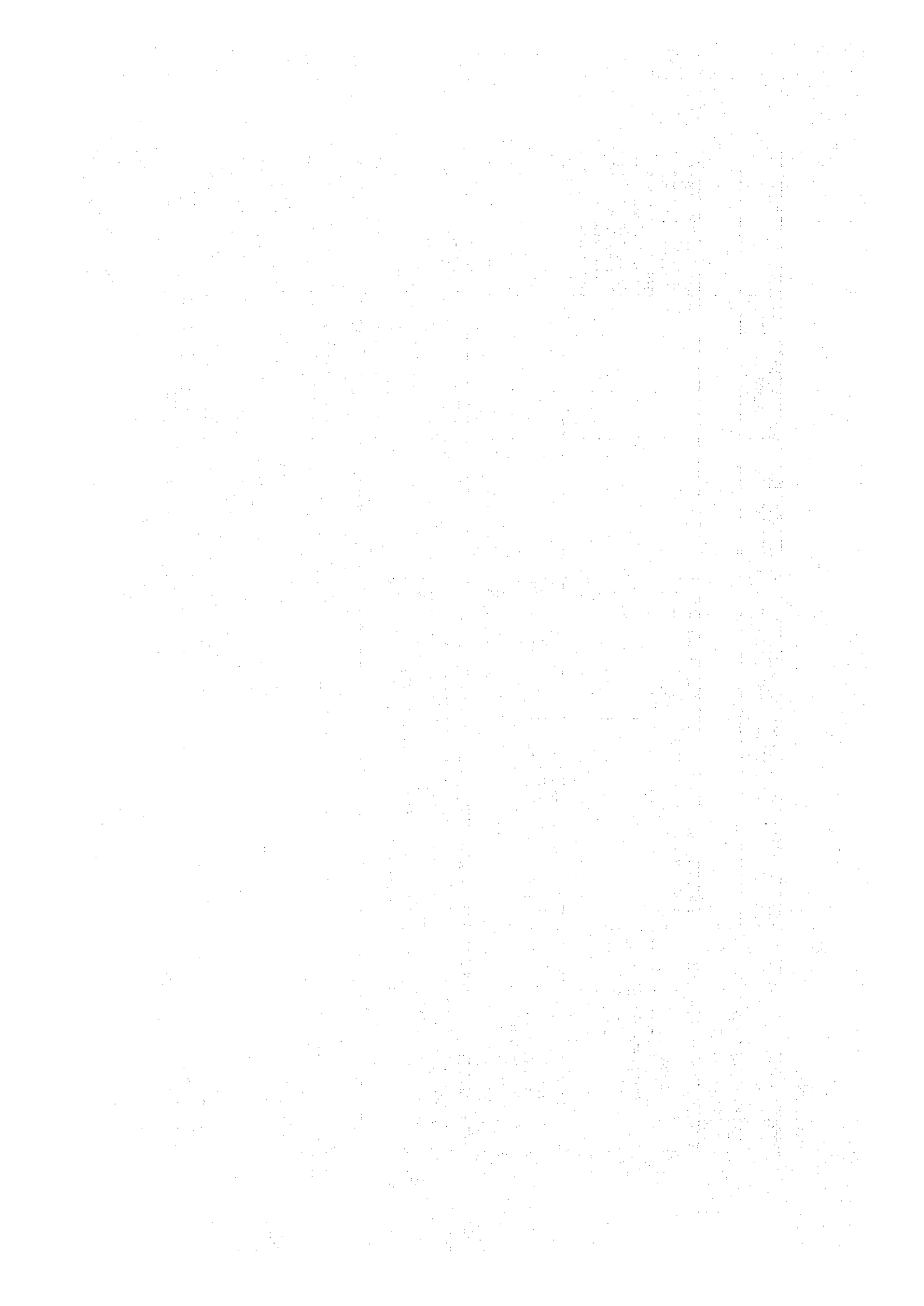
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(CONTINUED)

SPECIFIC ITEMS	YEAR	PERFORMANCE FROM THE BEGINNING OF THE PROJECT TO DEC., 1985	RESULT OF PRE-EVALUATION BY JAPANESE SIDE	ANNUAL WORK PLAN FROM JAN. TO OCT., 1986 BY INDONESIAN SIDE	FINAL EVALUATION
III. SOCIAL AND ECONOMIC STUDY					
1) Social impact analysis a. Field survey b. Data adjustment c. Arrangement of report.	1983 - 1985	* LTE conducted field survey 3 times, and arranged the report.	* Duty of LTE was finished on schedule.		Based on the revised scope of work, the Japanese side has completed the studies on social impact analysis, plant operation economics and micro-computer as scheduled.
2) Plant operation economics a. Data collection b. Data analysis c. Arrangement of report.	1985	* LTE conducted data collection and analysis about plant operation economics.	- ditto -		
3) Micro-computer a. Data analysis for the field survey b. Training for BPPT	1984 - 1985	* The result of above mentioned field survey was analyzed with micro-computer by STE. * The STE trained C/P to utilize the micro-computer.	* System analysis method with the help of micro-computer was successfully trained to C/P.		

(Signature)

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参考資料－2

バイオマスエネルギー研究開発

協力事業討議議事録（昭和57年

10月22日）

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial reporting and compliance with regulatory requirements. The text notes that incomplete or inconsistent records can lead to misunderstandings, disputes, and potential legal consequences.

2. The second section addresses the challenges associated with data management and storage. It highlights the need for secure and scalable solutions to handle large volumes of information. The document suggests that organizations should invest in robust IT infrastructure and implement strict security protocols to protect sensitive data from unauthorized access and loss. Additionally, it stresses the importance of regular data backups and disaster recovery plans.

3. The third part of the document focuses on the role of technology in streamlining operations and improving efficiency. It discusses how automation and digital tools can reduce manual errors, save time, and enhance productivity. The text encourages organizations to explore innovative technologies and foster a culture of continuous learning and adaptation to stay competitive in a rapidly changing market.

4. The final section discusses the importance of collaboration and communication within an organization. It states that effective teamwork and clear communication are vital for achieving common goals and resolving conflicts. The document recommends establishing open channels of communication, holding regular meetings, and encouraging employees to share their ideas and feedback. It also emphasizes the need for strong leadership and a supportive work environment.

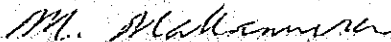
THE RECORD OF DISCUSSIONS BETWEEN THE JAPANESE  
IMPLEMENTATION SURVEY TEAM AND THE AUTHORITIES  
CONCERNED OF THE GOVERNMENT OF THE REPUBLIC OF  
INDONESIA ON THE JAPANESE TECHNICAL COOPERATION  
FOR THE PROJECT ON THE BIOMASS ENERGY RESEARCH  
AND DEVELOPMENT CENTER

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as JICA) and headed by Mr. Makoto Nakamura, Head, Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA, visited the Republic of Indonesia from 12 to 26 October, 1982 for the purpose of working out the details of the technical cooperation program concerning the Project on the Biomass Energy Research and Development Center in the Republic of Indonesia.

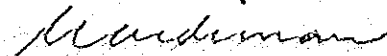
During its stay in the Republic of Indonesia, the Team exchanged views and had a series of discussions with the Officials of the Agency for the Development and Application of Technology headed by Ir. Wardiman in respect of the desirable measures to be taken by both Governments for the successful implementation of the above-mentioned Project.

As a result of the discussions, both parties agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

Jakarta, October 22, 1982



Makoto Nakamura  
Leader,  
Japanese Implementation Survey  
Team,  
Japan International Cooperation  
Agency, Japan



Ir. Wardiman Djojonegoro  
Director of Systems Analysis,  
The Agency for the Development  
and Application of Technology



THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of Japan and the Government of the Republic of Indonesia will cooperate with each other in implementing the Project on the Biomass Energy Research and Development Center (hereinafter referred to as "the Project") for the purpose of promoting the alcohol production from biomass resources, thereby contributing to the conservation and the diversification of energy resources in the Republic of Indonesia.
2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in Annex II through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. Privileges, exemptions and benefits to be granted by the Government of the Republic of Indonesia to the Japanese experts and their families in the Republic of Indonesia will be no less favourable than those granted to experts and their families of third countries or of international organizations performing similar missions, and will include the followings:
  - (1) Exemption from income tax and charges of any kind imposed on or in connection with the living allowances remitted from abroad in relation with the implementation of the Project;
  - (2) Exemption from import and export duties and any other charges imposed in respect of personal and household effects which may be brought into from abroad or taken out of the Republic of Indonesia;
  - (3) Exemption from import tax, import sales tax, sales tax, and other taxes and charges of any kind imposed on or in connection with the purchase in the Republic of Indonesia by the Japanese

experts of one motor vehicle per each expert;

- (4) Free local medical services and facilities to the Japanese experts and their families.

### III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials necessary for the implementation of the Project as listed in Annex III, through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The articles referred to in 1. above will become the property of the Republic of Indonesia upon being delivered c.e.f. to the Indonesian authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese experts referred to in Annex II.

### IV. TRAINING OF INDONESIAN PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to receive at its own expense the Indonesian personnel connected with the Project for technical training in Japan through the normal procedures under the Colombo Plan Technical Cooperation Scheme.
2. The Government of the Republic of Indonesia will take necessary measures to ensure that the knowledge and experience acquired by the Indonesian personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

### V. SERVICES FOR INDONESIAN COUNTERPART PERSONNEL AND ADMINISTRATIVE PERSONNEL

1. In accordance with the laws and regulations in force in the Republic of Indonesia, the Government of the Republic of Indonesia will take necessary measures to secure at its own expense necessary services for Indonesian counterpart personnel and administrative personnel as listed in Annex IV.

2. As to the Indonesian counterpart personnel, the Government of the Republic of Indonesia will endeavour to allocate the necessary number of suitably qualified personnel corresponding to each Japanese expert to be dispatched by the Government of Japan as specified in Annex II, for effective and successful implementation of the Project.

#### VI MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

1. In accordance with the laws and regulations in force in the Republic of Indonesia will take necessary measures to provide at its own expense:
  - (1) Land, buildings and facilities as listed in Annex V;
  - (2) Supply or replacement of machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under Article III above;
  - (3) Transportation facilities and travel allowance for the Japanese experts for the official travel within the Republic of Indonesia;
  - (4) Suitable furnished accommodations for the Japanese experts and their families.
2. In accordance with the laws and regulations in force in the Republic of Indonesia, the Government of the Republic of Indonesia will take necessary measures to meet:
  - (1) Expenses necessary for the transportation within the Republic of Indonesia of the articles referred to in Article III above as well as for the installation, operation and maintenance thereof;
  - (2) Customs duties, internal taxes and any other charges, imposed in the Republic of Indonesia on the articles referred to in Article III above;
  - (3) All running expenses necessary for the implementation of the Project.

#### VII. ADMINISTRATION OF THE PROJECT

1. Director of Systems Analysis of the Agency for the Development and Application of Technology will bear overall responsibility for the

implementation of the Project and the Director of the Biomass Energy Research and Development Center will be responsible for the administrative and managerial matters of the implementation of the Project.

2. Japanese Chief Advisor and other experts will provide Director of Systems Analysis of the Agency for the Development and Application of Technology and the Director of the Biomass Energy Research and Development Center necessary recommendation and advice on the technical matters concerning the implementation of the Project.
3. For the effective and successful implementation of the Project, a Joint Committee (hereinafter referred to as "the Committee") will be established with the function and composition as referred to in Annex VI.

#### VIII. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Republic of Indonesia undertakes to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Indonesia except for those arising from the wilful misconduct or gross negligence of the Japanese experts.

#### IX. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Attached Document.

#### X. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be four (4) years from the date of the signing of this Record of Discussions. However, there will be a general review by the Committee on the progress of the implementation of the Project after two (2) years from the commencement of the cooperation period in order to assess whether the term of cooperation should be modified for the successful implementation of the Project.

*M. M.*

*M*

MASTER PLAN

1. Objectives of the technical cooperation are:

- (1) To provide technical advice and guidance to the Indonesian counterpart personnel in the field of raw material cultivation;
- (2) To provide the theoretical and practical training for the Indonesian counterpart personnel in the field of alcohol production;
- (3) To conduct research and development and to transfer the technologies so obtained to the Indonesian counterpart personnel in the field of alcohol production;
- (4) To conduct social and economic study for alcohol production.

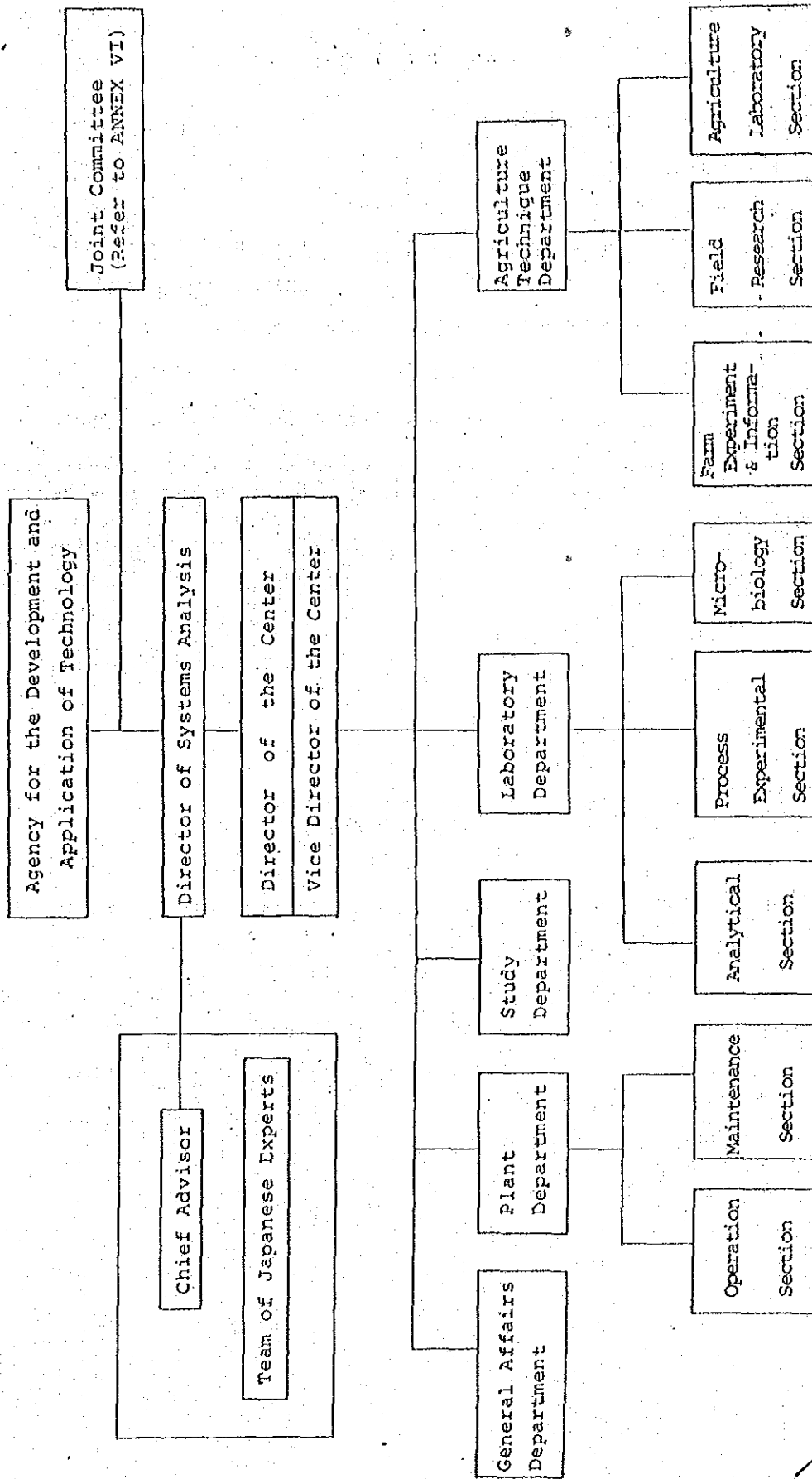
2. Items of the technical cooperation are:

- (1) Raw material cultivation (sweet potato)
  - (i) Preparation of experimental field
  - (ii) Variety collection and verifying test
  - (iii) Study on Cultivation method
- (2) Technology for alcohol production
  - (i) Pre-treatment (liquefaction, saccharification, etc.)
  - (ii) Fermentation
  - (iii) Distillation
  - (iv) Waste treatment
  - (v) Production control
  - (vi) Plant maintenance
- (3) Social and economic study for alcohol production
  - (i) Economics of alcohol production
  - (ii) Analysis for energy demand in rural area
  - (iii) Energy substitution program in rural area
  - (iv) Analysis for social and economic impact of alcohol production in rural area
  - (v) Long term and nation wide alcohol program

*M. M.*

*H*

3. Administrative Organization



JAPANESE EXPERTS

Experts in the fields of:

1. Raw Material Cultivation
2. Research of Alcohol Production
3. Processing of Alcohol Production (Plant Operation)
4. Processing of Alcohol Production (Plant Maintenance)
5. Social and Economic Study
6. Coordinator

- Note: (1) One of the above-mentioned experts will be appointed as the Chief Advisor.
- (2) Short-term experts may be dispatched, if necessary, for the installation of the equipment and machinery provided by the Government of Japan and for other purposes.

LIST OF MAIN ARTICLES

1. Agricultural machinery and implements and materials necessary for raw material cultivation.
2. Equipments and materials for analysis, determination, cultivation test, fermentation test and waste treatment test.
3. Equipments for social and economic study.
4. Vehicles
5. Other necessary equipments.

*M. A.*

*M*

ANNEX - IV

LIST OF INDONESIAN STAFF

1. Director of the Center
2. Counterpart personnel to the Japanese experts
  - (1) Engineers  
(corresponding to the fields of the experts as listed in Annex II)
    - (i) Raw Material Cultivation
    - (ii) Research of Alcohol Production
    - (iii) Processing of Alcohol Production
    - (iv) Social and Economic Study
  - (2) Necessary number of technicians mutually agreed upon.
3. Administrative Staff
  - (1) Administration
  - (2) Accounting
  - (3) Clerical work
4. Other personnel mutually agreed upon as necessary.

ANNEX - V

LIST OF LAND, BUILDINGS AND FACILITIES

1. Space of land and buildings when necessity arises
2. Office rooms for the experts
3. Conference rooms
4. Library
5. Others

*M. M.*

*M*



THE JOINT COMMITTEE

1. Function

The Joint Committee composed will meet at least once a year or whenever necessary and will work:

- (1) To review the overall progress of the Tentative Schedule of Implementation and the technical cooperation program set out in this Record of Discussions;
- (2) To formulate the Annual Work Plan of the Project in line with the Tentative Schedule of Implementation set out in this Record of Discussions;
- (3) To review and exchange views on major issues arising from, in connection with the technical cooperation program.

2. Composition

(1) Chairman

Director of Systems Analysis

(2) Members

(a) Indonesian Side

- (i) Director of the Center
- (ii) Vice Director of the Center
- (iii) Representative of the B.P.P.T.
- (iv) Representative of BAPPENAS
- (v) Representative of SET/KAB
- (vi) Representative of Department of Agriculture
- (vi) The other personnel as needed

(b) Japanese Side

- (i) Chief Advisor
- (ii) Other experts and personnel concerned to be dispatched by JICA, if necessary
- (iii) Resident Representative of Jakarta Office, JICA.

*MM*  
Note: Officer-in-charge of the Embassy of Japan can attend the Joint Committee meetings as an observer.

参考資料 - 3

バイオマスエネルギー研究開発

協力事業暫定実施計画書（昭和

57年10月22日）




TENTATIVE SCHEDULE OF IMPLEMENTATION AND TECHNICAL  
COOPERATION PROGRAM OF THE TECHNICAL COOPERATION  
FOR THE PROJECT ON THE BIOMASS ENERGY RESEARCH  
AND DEVELOPMENT CENTER

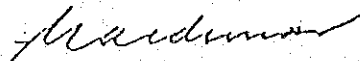
The Japanese Implementation Survey Team and the representatives of the Agency for the Development and Application of Technology have jointly formulated the Tentative Schedule of Implementation and the Technical Cooperation Program of the Project as annexed hereto (Annex I, II, III and

These documents have been formulated in connection with Article graph 2 of the Attached Document of the Record of Discussions signed by the Japanese Implementation Survey Team and the Agency for the Development and Application of Technology for the Technical Cooperation Project Biomass Energy Research and Development Center in the Republic of Indonesia on the conditions that necessary budget will be allocated for the implementation of the Project, and are subject to change within the framework of the Record of Discussions when necessity arises in the course of implementation of the Project.

Jakarta, October 22, 1982



Makoto Nakamura  
Leader,  
Japanese Implementation  
Survey Team,  
Japan International Cooperation  
Agency, Japan



Ir. Wardiman Djojonegoro  
Director of Systems Analysis,  
The Agency for the Development  
Application of Technology

TENTATIVE SCHEDULE OF IMPLEMENTATION

ITEMS	PHASE FISCAL YEAR	PREPARATION AND BASIC ESTABLISHMENT				DEVELOPMENT		REMARKS
		1982	1983	1984	1985	1986	SELF RELIANCE	
INDONESIAN SIDE	Building Construction	→						
DISPATCH OF SURVEY TEAM	Preliminary Survey Team	↔						
	Implementation Survey Team	↔						
	Consultation Team		↔					
	Technical Guidance Team			↔				As necessity arises
	Evaluation Team					↔		
JAPANESE SIDE	Expert for Long-Term Survey	↔						
SHORT-TERM EXPERTS	Long Term Experts		↓					One line represents one expert.
	(1) Chief Advisor				↓			
	(2) Raw Material Cultivation				↓			
	(3) Processing of Alcohol Production (Plant Operation)				↓			
	(4) Processing of Alcohol Production (Plant Maintenance)				↓			
	(5) Social and Economic Study				↓			
(6) Coordinator				↓				
Short-Term Experts								
(1) Raw Material Cultivation					↔			
(2) Processing of Alcohol Production					↔			
								Number and duration of these experts will be agreed upon during the operation of the project.

M. M.

ITEMS	PHASE FISCAL YEAR	PREPARATION AND BASIC ESTABLISHMENT				DEVELOPMENT RELIANCE	REMARKS
		1982	1983	1984	1985		
Training of Indonesian Counterpart Personnel in Japan  Provision of Equipment and Machinery	(3) Research of Alcohol Production	↔	↔	↔	↔	Number and duration of these experts will be agreed upon during the operation of the project.	
	(4) Social and Economic Study						
	(5) Plant Maintenance						
	(1) Raw Material Cultivation						
	(2) Processing of Alcohol Production						
	(3) Research of Alcohol Production	↔	↔	↔	↔		
	(4) Social and Economic Study						

Notes: This schedule is subject to condition that necessary budget will be acquired for the implementation of the Project.

This scope of technical cooperation is subject to change within the scope of the provisions given in the Record of Discussions.

M. M. KJ

## TECHNICAL COOPERATION PROGRAM OF THE PROJECT

ITEMS	PHASE		PREPARATION AND BASIC ESTABLISHMENT			DEVELOPMENT		SELF RELIANCE
	FISCAL YEAR		1982	1983	1984	1985	1986	
1. Raw Material Cultivation (Sweet Potato) (1) Preparation of experimental field (prepared by Indonesian side)				* Survey on condition of soil, irrigation, drainage and etc. * Arrangement of the experimental field for cultivation				
(2) Variety collection and verifying test (with small sized field)				* Collection of local varieties and their data * Verifying test of varieties collected * Comparative analysis on the results of verifying test conducted * Selection of appropriate varieties for cultivation				
(3) Study on cultivation method (with appropriate sized field)						* Study on appropriate cultivation method using the selected varieties	* Analysis of the results of the above mentioned cultivation methods and its reporting	

PHASE FISCAL YEAR	PREPARATION AND BASIC ESTABLISHMENT			DEVELOPMENT		SELF RELIANCE
	1983	1984	1985	1986		
2.. Alcohol Production (1) Basic research (i) Pre-treatment (ii) Fermentation (iii) Waste treatment	* Survey and screening of yeast High-temperature tolerant Low-pH tolerant Alcohol tolerant	* Survey and screening of liquefying and saccharifying enzyme producing microbe	* Improvement of microbe strain			
	* Determination of the optimum condition for liquefying and saccharifying and fermentation of Cassava and sweet potato * Methane fermentation of distillery waste	* Aerobic treatment of effluent after methane fermentation * Low-temperature cooking process (70-90°C)	* Determination of the optimum condition for liquefying, saccharifying and fermentation of other raw material (Sago-palm, Nipa-palm etc) * Submerged culture of liquefying and saccharifying enzyme producing microbe * Basic research on cellulose saccharifying process	* Continuous fermentation by conventional process and immobilized yeast process (Nipa-palm etc)		

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PHASE FISCAL YEAR	PREPARATION AND BASIC ESTABLISHMENT			SELF RELIANCE
	1983	1984	1985	
ITEMS (2) Processing (i) Pre-treatment (ii) Fermentation (iii) Distillation (iv) Waste treatment (v) Production control (vi) Plant maintenance	1983 * Confirmation of technical standard in plant operation (Pre-treatment process of raw material Cooking process Liquefying and saccharifying process Nutrients Distillation process)	1984 * Low-temperature cooking process (70-90°C)	1985 * Fermentation of other raw material (Sago-palm, Nipa-palm etc.) * Methane fermentation and Aerobic treatment of effluent in pilot-plant	1986 * Non-cooking process * Submerged culture of liquefying and saccharifying enzyme producing microbe
3. Social and Economic Study (1) Economic of alcohol production	* Necessary data preparation * Raw material collecting system * Raw material pricing system			
(2) Analysis for energy demand in rural area	* Demand data collection (Sampling survey)	* Analysis of demand pattern		
(3) Energy-substitution program in rural area		* Alcohol utilization in each demand sector	* Replacement plan to alcohol in rural area	

M. M. 

ITEMS	PHASE		PREPARATION AND BASIC ESTABLISHMENT		DEVELOPMENT		SELF-RELIANCE
	FISCAL YEAR		1983	1984	1985	1986	
(4) Analysis for social and economic impact in rural area					* Social and economic effect of alcohol development in rural area * Development of analytical model		
(5) Long-term and nation wide alcohol program						* Long-term alcohol development program * Analysis for impact on national economy	

NOTES: This schedule is subject to condition that necessary budget will be acquired for the implementation of the Project.

This scope of technical cooperation is subject to change within the scope of the provision given in the Record of Discussions.

*PM. 5/1*  
*W*

ANNUAL WORK PLAN FROM SEPTEMBER 1982 MARCH 1984

SCOPE OF TECHNICAL COOPERATION	FISCAL YEAR		1983				
	1982	1983	April	1/4	2/4	3/4	4/4
1. Indonesian Side (1) Construction of the Building (2) Preparation for the Acceptance of Japanese Experts (3) Selection of Equipment and Machinery (4) Preparation for the Training of Indonesian Counterpart Personnel	3/4	4/4		1/4	2/4	3/4	4/4
2. Japanese Side (1) Dispatch of Japanese Experts Long-term Experts							
Short-term Experts							

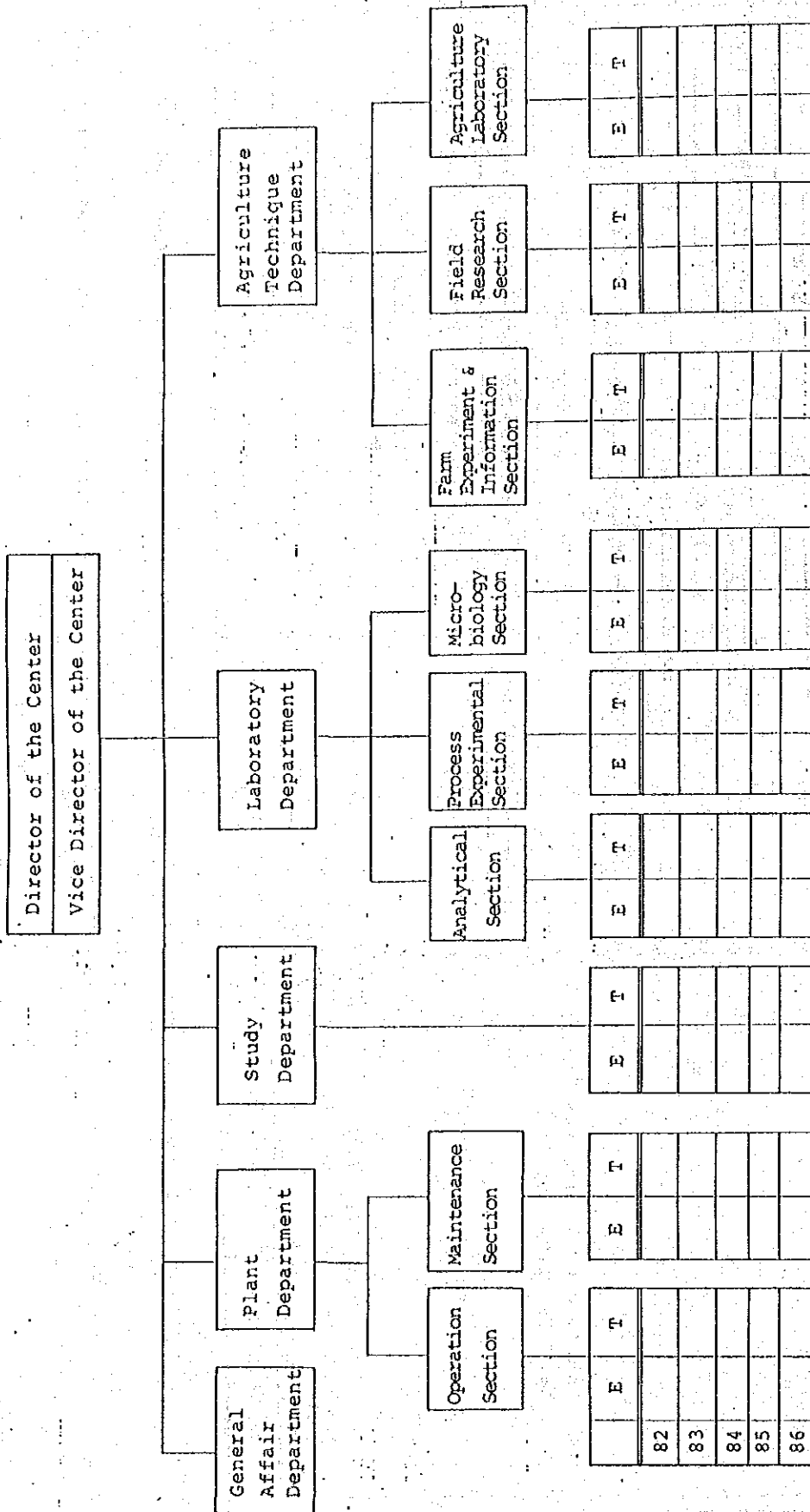
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SCOPE OF TECHNICAL COOPERATION	1982		April		1983	
	3/4	4/4	1/4	2/4	3/4	4/4
(2) Training of Indonesian Counterpart Personnel in Japan		Fermentation Distillation Distillation Plant Maintenance Research of Alcohol Production	Fermentation Distillation Distillation Plant Maintenance Research of Alcohol Production		Plant Maintenance Social and Economic Study Raw Material Cultivation	
	Plant Operating 2 persons			Research of Alcohol Production Research of Alcohol Production Social and Economic Study Raw Material Cultivation		
(3) Provision of Equipment and Machinery						

NOTES: This schedule is subject to condition that necessary budget will be acquired for the implementation of the Project.  
 This scope of technical cooperation is subject to change within the scope of the provisions given in the Record of Discussions.

*M.D.*  
*MJ*

ANNEX IV - STAFFING PLAN



Note: E : Engineer  
T : Technician

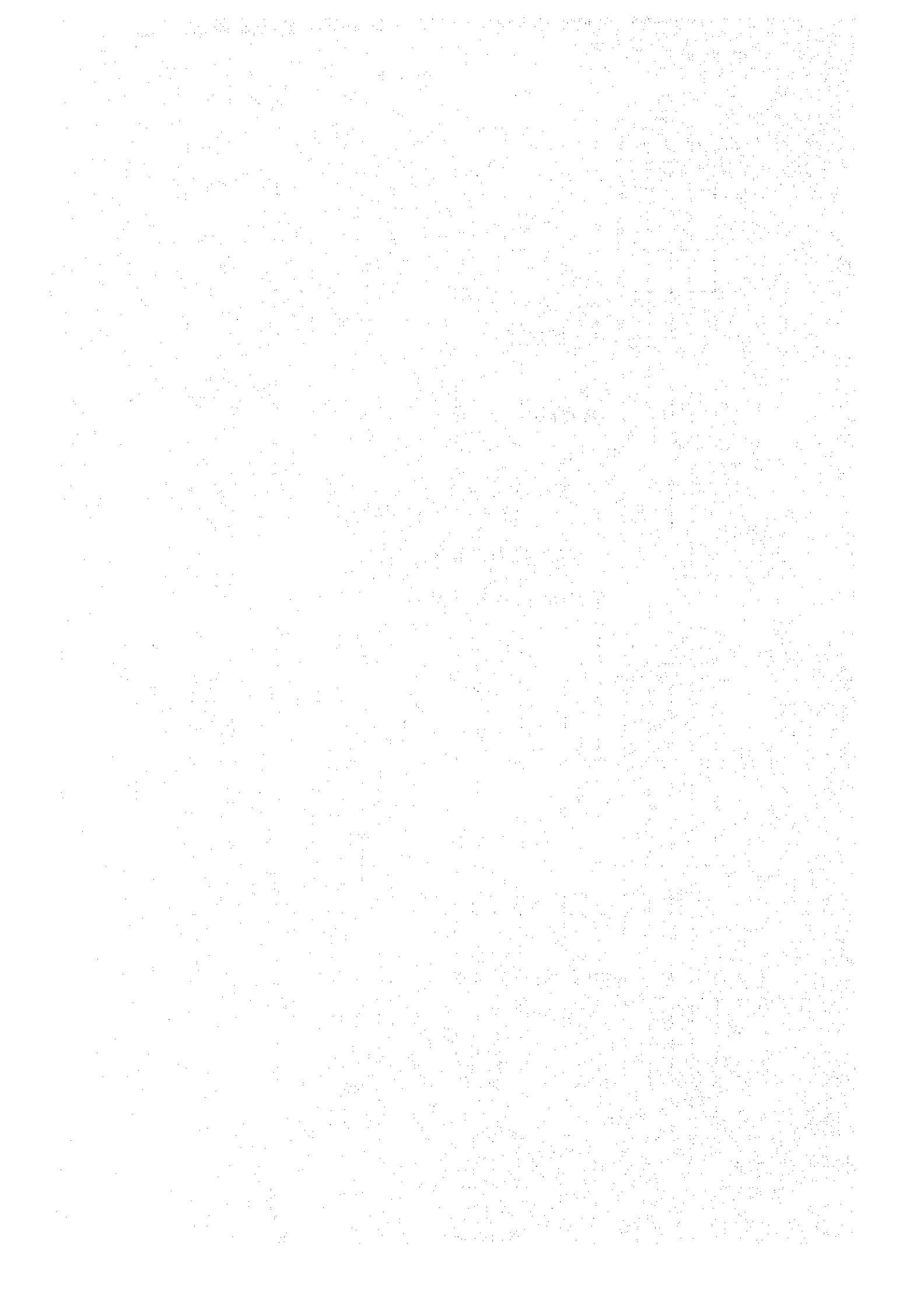
*M.A.*

参考資料一 4

バイオマスエネルギー研究開発

協力事業計画打合せ調査団会議

議事録（昭和58年12月15日）



MINUTES OF MEETING BETWEEN THE CONSULTATION TEAM  
FOR THE BIOMASS ENERGY RESEARCH AND DEVELOPMENT CENTER  
AND THE AGENCY FOR THE ASSESSMENT AND  
APPLICATION OF TECHNOLOGY OF THE REPUBLIC OF INDONESIA


The JICA Consultation Team for the Biomass Energy Research and Development Center (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as JICA) and headed by Mr. Shigeimitsu Suzuki, Special Assistant to the Director of Mining and Industrial Development Cooperation Department, JICA, visited the Republic of Indonesia from December 6 to December 18, 1983 for the purpose of :


- a) evaluation of the performance of the Biomass Energy Research and Development Center Project.
- b) working out the annual work plan of the Biomass Energy Research and Development Center Project.
- c) establishing the necessary measures for the good implementation of the Biomass Energy Research and Development Center Project.

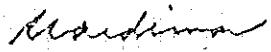
During its stay in the Republic of Indonesia, the Team exchanged views and had a series of discussions with the officials of the Agency for the Assessment and Application of Technology headed by Mr. Wardiman Djojonegoro in respect of the desirable measures to be taken by both sides for the successful implementation of the above mentioned project.


As a result of the discussions, both parties agreed upon the Annual work plan and measures to be taken by both sides as referred to in the document attached hereto.

Jakarta, December 15 , 1983

  
Shigeimitsu Suzuki.  
Leader,  
Japanese Consultation Team,  
Japan International Cooperation Agency.



  
Wardiman Djojonegoro.  
Deputy Chairman for Administration,  
Agency for the Assessment and Application  
of Technology.





ATTACHED DOCUMENTS

1. AGENDA
2. DISCUSSION

1. AGENDA

- I. Objective and roles of the project in relation with national policies, considering the recent economic situation.
- II. Roles and functions of the Japanese Technical Cooperation.
- III. Evaluation of the present performance of the project and identification of problems.
  1. General
  2. Raw Material Cultivation.
  3. Alcohol Production.
  4. Social and Economic Study.
- IV. Annual work plan from January, 1984 to March, 1985 for the project in line with the Tentative Schedule of Implementation set out in the Record of Discussions.
- V. Measures to be taken by both sides.

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## 2. DISCUSSION

### I OBJECTIVES AND ROLES OF THE PROJECT.

Mr. Wardiman Djojonegoro explained the objectives and roles of the BERDC Project in the framework of the Alternative Energy Program of the Government of the Republic of Indonesia.

### II ROLES AND FUNCTION OF THE JAPANESE TECHNICAL COOPERATION.

Mr. Shigemitsu Suzuki explained the role and function of the Japanese Technical Cooperation.

### III EVALUATION AND PROBLEMS

Both sides reviewed the present performance in the light of R/D and TSI signed on October 22, 1983 and have found the following.

#### 1. General

- 1) Communication between Japanese experts and BPP -Teknologi staff is inadequate because of language and location problems, and many problems seems to be caused by those.
- 2) There seems to be a shortage in staff, the budget is limited, and the procedure of procurement takes long time.
- 3) There seems to be inadequate consultation between BPP Teknologi and Japanese experts with respect to the overseas training program. It must be assured that experience and knowledge gained by this, are fully utilized in this project.
- 4) Others
  - i) Office supplies are not sufficient
  - ii) Access road is still not satisfactory

#### 2. Raw material cultivation

#### A. Performance

i) Preparation of experimental field.  
This is not yet fully carried out. This seems to be due to limited local budget for machineries and equipments.

ii) Variety collection and verifying tast.

This will be finished on schedule. Activities scheduled to be done in 1984 are already started in advance from August 1983.

#### B. Problems

i) The role of Mr. Wargiono dan Mr. Tri Atmodjo should be more clearly defined.

ii) Mr. Dodo as the agricultural counterpart is being trained in alcohol production in Japan.

### 3. Alcohol production

#### 1) Basic research

##### A. Performance

i) Survey and screening of yeast  
The methodology of research will be transferred within this fiscal year.

ii) Determination of the optimum condition for liquefying, saccharifying and fermentation of cassava and sweet potato.  
There has been no activities so far, but on cassava this will be accomplished and on sweet potato there will be delay.

iii) Methane fermentation of distillery waste.  
Beaker test has been carried out so far and will be continued during next year.

iv) Low temperature cooking process.  
This is scheduled to be conducted in 1984 but has already been done several times. This will be continued in 1984 with various enzymes and quantities.

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B. Problems

i) Counterparts

There are two counterparts. However, one of them also works at plant so that technology transfer may be affected when plant is in operation.

2) Processing.

A. Performance

i) Confirmation of technical standard in plant operation.

Two test run were tried. The troubles found in the second test run have not fully indentified yet. They seem to be at heat exchanger in front of distillation unit and broth filter. The third test run will be conducted soon to clarify them. After troubles are fixed, performance test (three shift) will be conducted by next March.

ii) Low temperature cooking process. Schedule is moved up from next year and trial test run will be conducted this year.

B. Problems

i) Fixing of troubles.

Even if actual nature of the defect and cost needed are clarified, responsible party to do the fixing is not yet decided. The contract between Indonesia and contractors or consultants has no guarantee clause, which is rather exceptional

ii) Staffing.

In order to do the performance test based on the design basis, there seem to be shortage of staff to form a three shift work force.

iii) Maintenance

There is inadequacy in prompt maintenance service for ordinary troubles. On the matter peculiar to this plant satisfactory technology transfer has not yet finished.

#### 4. Social and Economic Study

##### A. Performance

- i) Economic of alcohol production. "Necessary data preparation" is in progress. "Raw material collecting and pricing system" has not been conducted so far but "collecting system" will be completed by next March and "pricing system" by next fiscal year.
- ii) Analysis for energy demand in rural area. "Demand data collection" will be started from next July.

##### B. Problems

- i) Counterparts seem to be not assigned for doing full-time job, but just as part-timers. Therefore, the study to be carried out in cooperation with both sides are apt to be delayed.
- ii) Outline should be defined by both sides.

#### IV. ANNUAL WORK PLAN FROM JANUARY, 1984 TO MARCH, 1985

Both sides agreed to the annual workplan as below.



< ANNUAL WORK PLAN FROM JANUARY 1984 TO MARCH 1985 >

ITEM / FISCAL YEAR	1983 4/4	1984 1/4	2/4	3/4	4/4
I. Indonesian Side (1) Staff Recruitment (2) Acquisition of necessary budget for this project.					
II. Japanese Side (1) Dispatch of Japanese Experts (1) Long-Term Experts * Chief-Advisor (Research of Alcohol Production) * Raw Material Cultivation * Processing of Alcohol Production (Plant Operation) * Processing of Alcohol Production (Plant Maintenance) * Social and Economic Study * Coordinator (ii) Short-Term Experts * Research of Alcohol Production * Plant Maintenance * Raw Material Cultivation * Social and Economic Study (2) Training of Indonesian Counterpart Personnel in Japan * Research of Alcohol Production * Raw Material Cultivation * Social and Economic Study (3) Provision of Equipment and Machinery					
		(Cultivation of enzyme producing microbes)	(Instruments and diagnosis)	(Distillation Maintenance)	
			(Sweet Potato Cultivation)		
			(System Analysis)		
				(3-5 P x 6 M)	

NOTES: This schedule is subject to conditions that necessary budget will be acquired for the implementation of the project. This scope of technical cooperation is subject to change within the scope of the provisions given in the Record of Discussions.  
Each of activity must be described in term of reference in detail.

< TECHNICAL COOPERATION PROGRAM OF THE PROJECT >

ITEM / FISCAL YEAR	1983 4/4	1/4	1984 2/4	3/4	4/4
1. Raw Material Cultivation (Sweet Potato) (1) Preparation of Experimental field 1) Survey on condition of soil, irrigation, drainage and etc. 2) Arrangement of the experimental field for cultivation (2). Variety collection and verifying test 1) Verifying test of varieties collected 2) Comparative analysis on the result of verifying test conducted 3) Selection of appropriate varieties for cultivation (3) 1) Study on cultivation method 1) Study on the prevailing cultivation method 2) Study on appropriate cultivation method using the selected varieties 3) Collecting and analysis of the result of above mentioned cultivation method and its reporting (4) Research on the improvement of soil fertility (5) Raw material cultivation of sweet potato (6) Soil analysis etc.					





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ITEM / FISCAL YEAR	1981			
	1981 4/4	1/4	2/4	3/4
3. Social and Economic Study (1) Economic of alcohol production 1) Necessary data preparation 2) Raw material collecting system 3) Raw material pricing system  (2) Analysis for energy demand in transportation : 1) Demand data collection ( sampling survey ) 2) Analysis of demand pattern (3) Alcohol utilization in each sector				

V. MEASURES TO BE TAKEN BY BOTH SIDES

Both sides agreed to make the maximum efforts in order to fulfill the agreed Annual Work plan, and will take the following measures.

1. Communication between both sides.

To improve the mutual understanding, monthly meetings will be held and attended by :

i) Japanese side,  
Chief advisor and other necessary experts  
Appropriate staff of JICA Jakarta Office.

ii) Indonesian side.  
Project officer.  
Director, General Manager and necessary counterparts.

2. Reports.

A minute of meeting of the monthly meeting will be made.

A monthly report of the program will be made by both sides.

3. A discussion of the needed budget will be held at least once a year in the above mentioned meeting.

4. Measures to be taken by ERPT.

i) Maximum efforts should be made to secure the necessary budget, counterpart personnel and staff.

ii) Counterpart personnel should be fulltime. Responsible official should be on-site full time.

iii) Adequate consultation will be made with Japanese experts in the preparation of the training program in Japan.

iv) Request is to be repeated to the Provincial Government to speed up the access road improvement.

v) Attention should be paid to the following.



- A. Raw material cultivation.
- The counterpart should be appointed permanently.
  - Preparation of the sweet potato experimental field must be speeded up. Watering facilities is to be installed.
  - Proper maintenance service should be secured for the farm equipment.
- B. Alcohol Production.
- For basic research, two permanent counterpart personnel are to be appointed.
  - For processing, the necessary maintenance material should be secured.
- C. Social and Economic Study
- At least one permanent counterpart personnel is to be appointed.

5. Measures to be taken by Japanese side.

- i) Maximum efforts should be made to secure the necessary budget.
- ii) Maximum efforts will be made to dispatch competent short term experts in the following field.
- Sweet potato cultivation.
  - Cultivation of enzyme producing microbe.
  - Instruments maintenance and diagnosis.
  - Distillation unit maintenance.
  - System analysis for social economics.
- iii) Maximum efforts will be made to provide as many machinery and equipments as possible including:
- Machines and equipments for experimental agricultural field.
  - Methane fermentation test equipment.
  - Liquid chromatograph with the standard samples.
  - Gaschromatograph with the standard samples.

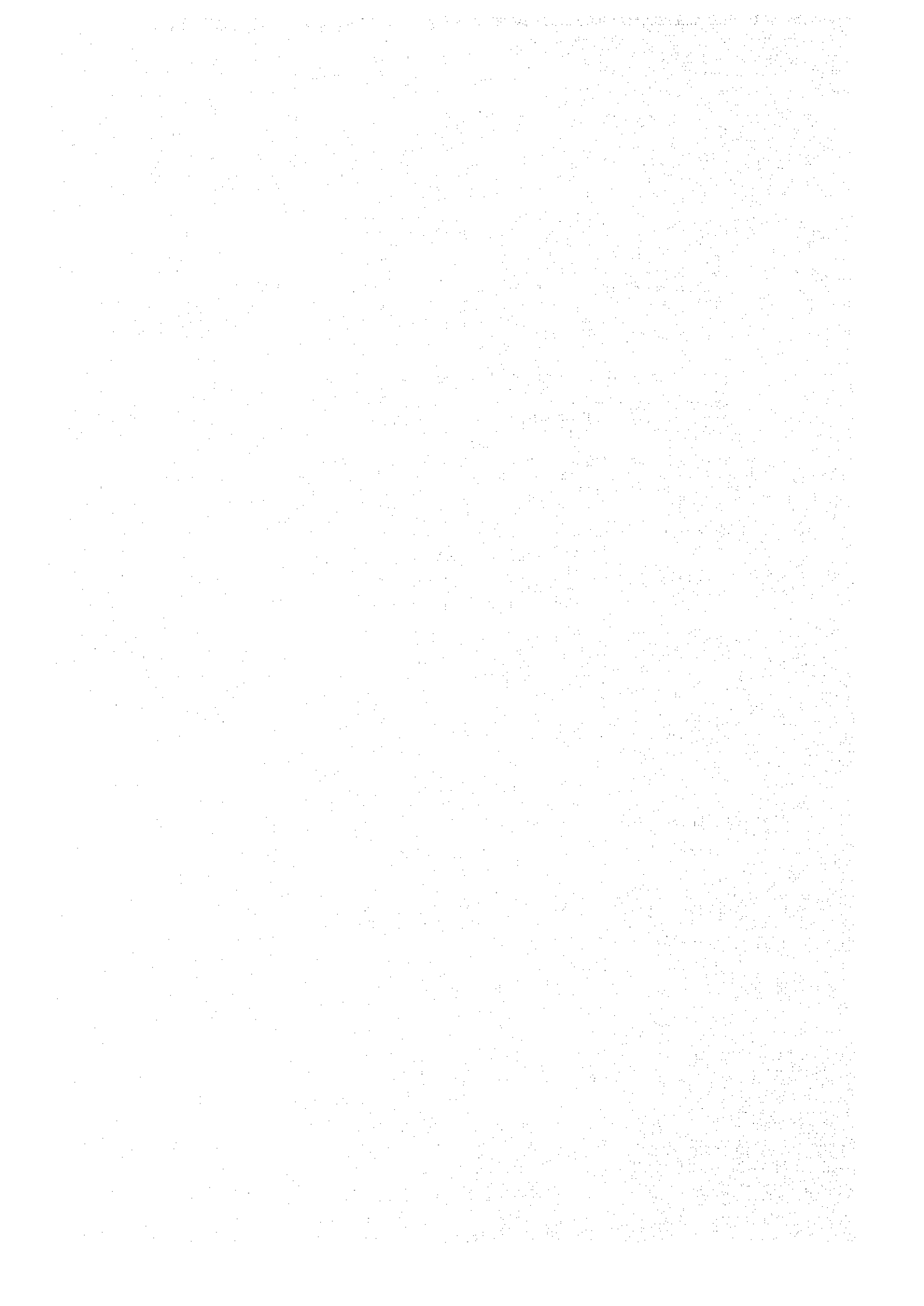
6. Both sides will make the maximum efforts to attain the expected plant performance according to the design basis as soon as possible. Financial arrangement of the fixing will be discussed by both sides.

参考資料－5

バイオマスエネルギー研究開発

協力事業巡回指導調査団（第1

次）会議事録（昭和59年12月）



MINUTES OF MEETING BETWEEN THE TECHNICAL GUIDANCE  
TEAM FOR THE BIOMASS ENERGY RESEARCH AND DEVELOPMENT CENTER AND  
THE AGENCY FOR THE ASSESSMENT AND APPLICATION  
OF TECHNOLOGY OF THE REPUBLIC OF INDONESIA

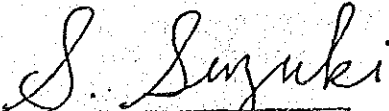
The JICA technical Guidance Team for the Biomass Energy Research and Development Center (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Shigemitsu Suzuki, Special Assistant to the Director of Mining and Industrial Development Cooperation Department, JICA, visited the Republic of Indonesia from November 28, to December 7, 1984 for the purpose of :

- a. Evaluation of the performance of the Biomass Energy Research and Development Center Project.
- b. Working out the annual work plan of the Biomass Energy Research and Development Center Project.
- c. Establishing the necessary measures for the good implementation of the Biomass Energy Research and Development Center Project.
- d. Discussion on the plant improvement.

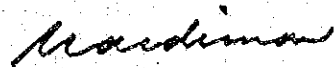
During its stay in the Republic of Indonesia, the Team exchanged views and had a series of discussion with the officials of the Agency for the Assessment and Application of Technology headed by Mr. Wardiman Djojonegoro in respect of the desirable measures to be taken by both sides for the successful implementation of the above mentioned project.

As a result of the discussions, both parties agreed to recommend to the respective government upon the annual work plan, measures to be taken by both sides and understanding on plant improvement as referred to in the document attached hereto.

Jakarta, December 6, 1984



Shigemitsu Suzuki  
Leader,  
Japanese Technical Guidance  
Team,  
Japan International  
Cooperation Agency



Wardiman Djojonegoro  
Deputy Chairman for Administration,  
Agency for the Assessment and  
Application of Technology

## ATTACHED DOCUMENTS

### I. AGENDA

### II. DISCUSSION

#### I. Agenda

- I) Evaluation of the present performance of the project and identification of problems.
  1. General
  2. Raw material cultivation
  3. Alcohol production
  4. Social and economic study
- II) Annual work plan from January, 1985 to March, 1986 for the project in line with the Record of Discussion.
- III) Measures to be taken by both sides.
- IV) Discussion on the plant improvement.

#### II. Discussion

##### I) Evaluation and comments

Both sides reviewed the present performance in the light of the annual work plan from January, 1984 to March, 1985 signed on December 15, 1983 and have found the following.

##### 1. General

- 1) Review on the measures stipulated in the previous Minutes which should have been taken by both sides.

Both sides have made considerable efforts to take the measures except the followings.

- i) In the monthly meeting sometimes there lacked adequate discussions about cooperation plan for the next month.
- ii) Responsible officials have not been fulltime, causing problems such as delay in procurement, very slow decision making and inadequate supervision of operators.

iii) Dispatch of distillation unit maintenance expert has not been done.

iv) Methane fermentation test equipment has not been provided yet.

## 2) Other comments

General performance of the project seems to be satisfactory except the followings.

i) Partnership between Indonesian counterparts and Japanese experts is not adequate causing trouble in work schedule and in smooth transfer of technology.

ii) There are very few books in the library.

iii) Staff house construction is too delayed.

## 2. Raw material cultivation

### A. Performance

#### i) Preparation for the experimental field

The reclamation work extended the acreage to about 5.66 ha. Technology transfer on the operation and maintenance of agricultural machines provided by JICA has been satisfactorily accomplished with the help of short term expert.

Basic design for irrigation and drainage was made with the help of short term expert but their actual installation has not been commenced.

#### ii) Variety collection and test

(Variety collection)

Total of 141 material were collected and 76 materials of them were done in 1984. They were brought from Bogor, Kuningan, and Tawangmangu. The report was made.

(Variety test)

53 materials were tested, and 22 of them were selected and will undergo the next selection step in 1985. The report was made.

#### iii) Study on cultivation method

#### iv) Research on the improvement of soil fertility

As to iii) and iv), test and research were conducted as follows and report was made.

(Test)

Extermination test against weevil.  
Pest and disease controlling test.

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(Research)

- On the adequate amount of fertilizer.
- On the preparation of stem cutting.
- On the suitable planting style of sweet potato's cut stem.
- On the effect of planting density.
- On the improvement of soil fertility.
- On continuous cropping of sweet potato.

v) Raw material cultivation of sweet potato

The raw material was cultivated on a trial base in an acreage of about 0.8 ha. The net yield was 17.831 ton/ha and net 14,279 ton of raw material were supplied to alcohol plant. (Mean cultivating term was 141 days.)

vi) Soil analysis and others

As far as this subject is concerned, we could not study thoroughly.

B. Comments

- i) Assignment of long term expert in this field will have been completed ahead of the schedule by July, 1985.
- ii) In order to attain the objective in this field, Department of raw material cultivation should be more clearly organized and strengthened, and BPPT should try to get cooperation from the Ministry of Agriculture of Indonesia.

3. Alcohol production

1) Basic research

A. Performance

- i) Screening and selection of high temperature , low pH, alcohol and sugar tolerance yeast.

Comparison of characters of three kinds of yeast (PD Asen, Hakken No.296, Nakken No.1) was carried out and reported already.

- ii) Screening and selection of liquefying and saccharifying enzyme producing microbe.

Short term expert trained the staff on the technique of selection, cultivation and activity comparison of pure strain.

- iii) Determination of the optimum condition for liquefying, saccharifying and fermentation of cassava and sweet potato.

- iv) Low temperature cooking process.

As to iii) and iv), these items were carried out together with determination of optimum enzyme volume and low temperature cooking process. The result of this study was reported already.

- v) Aerobic treatment of effluent after methane fermentation.  
This item will be proceeded till the end of March, 1985.

## 2) Processing

### A. Performance

- i) The operations for the investigation of ill working and making the plan of the improvement work were carried out 5 times. And the report for the improvement was made. Now, the improvement working is under planning with extension of the Grant Aid by the Government of Japan.
- ii) Three shift continuous operations were conducted twice. One was the seven-day operation with 350 tons of cassavea and the other was ten-day operation with 500 tons of cassava. But the result was partially unsatisfactory. The difficulty will be recovered after the improvement working is completed.
- iii) The operators have reached to certain level of skillfullness for plant operation
- iv) Low temperature cooking process is not yet tried.
- v) The maintenance work has been conducted satisfactorily.

## 4. Social and Economic study

### A. Performance

- i) "The scope of work and time schedule for social and economic study of the Biomass Energy Project" was revised at the beginning of FY 1984 (see attached paper-1), as the plan in the TSI (Tentative Schedule of Implementation) signed on October, 1982 was next to impossible for the proposed period to be attained thoroughly because of the lack of manpower of Japanese side.
- ii) The activities on the social and economic study during FY 1984 were not ideal but almost satisfactory although they are running a bit behind the "revised" schedule due to:
  - lack of manpower on both sides, and
  - delay of normal operation at the plant.
- iii) Micro-computer SORD M243 was installed at the end of April, 1984 which has been satisfactorily operated.
- iv) Short-term expert for systems analysis was dispatched here. During his stay in Indonesia, he trained BPPT staff how to deal with sophisticated program.

( ATTACHED PAPER -1)

NO. I T E M		REVISED SCHEDULE FOR SOCIAL AND ECONOMIC STUDY												
		1984						1985						
		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER		FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		
APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR			
A.	SOCIAL IMPACT ANALYSIS													
	1. Field Survey-1 (Sulu-suban)													
	2. Data adjustment and analysis													
	3. Field Survey-2 (May - Abong)													
	4. Data adjustment and analysis													
	5. Field Survey-3 (Mesuji)													
	6. Data adjustment and analysis													
	7. Arrangement of report													
B.	PLANT OPERATION ECONOMICS													
	1. Data Collection													
	2. Data analysis													
	3. Arrangement of report													
C.	STUDY PERIOD KEPT IN REFERENCE													
	(Training of micro computer system on ROI & POT calculation)													
D.	BACK TO JAPAN TEMPORARILY													

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II) ANNUAL WORK PLAN FROM JANUARY 1985 TO MARCH 1986.

1. Indonesian side requested on the dispatch of experts as follows:

1) On Agriculture :

- LTE (long term expert) : Soil fertility improvement.
- STE (short term expert) : How to operate using some of the agriculture equipment.
- STE : Breeder, especially for sweet potato improvement.

2) On research laboratory :

- STE : Microbiologist, especially on screening, cultivation and selection of microbe.
- STE : Enzyme technology, scale up of the enzyme production from tube to pilot plant, purification of enzyme.
- STE : Continuous methane fermentation process.
- STE : Immobilized yeast for ethanol production.
- STE : Ethanol fermentation with yeast recycling process.
- STE : Continuous ethanol fermentation process.

2. Both sides agreed to the annual work plan as below:

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TECHNICAL COOPERATION PROGRAM OF THIS PROJECT

FISCAL YEAR	1985														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
I. T. E. M.															
1. Raw Material Cultivation (Sweet Potato)															
(1) Preparation of experimental field. Arrangement of the experimental field for cultivation, soil irrigation, drainage and etc.															
(2) Variety collection and verifying test															
1) Verifying test of varieties collected															
2) Comparative analysis on the result of verifying test conducted															
3) Selection of appropriate varieties for cultivation															
(3) Study on cultivation method															
1) Study on the prevailing cultivation method															
2) Study on appropriate cultivation method using the selected varieties															
3) Collecting and analysis of the result of above mentioned cultivation method and its reporting															
(4) Research on the improvement of soil fertility															
(5) Research on continuous cropping and rotation system															
(6) Study on agronomic and economic feasibility of sweet potato's cultivation															

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CONT)

FISCAL YEAR ITEM	1984			1985											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
<p>2. Alcohol Production</p> <p>(1) Basic research 1) Improvement of microbe strain (target : to improve the activity of the ethanol producing yeast and to improve productivity of the amylase producing microbe).</p> <p>2) Submerged culture of liquefying and saccharifying enzyme producing microbe (target : to select the local &amp; Japanese microbe which is the best for mash production of liquefying &amp; saccharifying enzyme).</p> <p>3) Basic research on cellulose saccharifying process (target : to study how to measure the ability of cellulase producing microbe).</p> <p>4) Screening and selection of liquefying &amp; saccharifying enzyme producing microbe. Continuing the last program; from April '85 to work with bacteria.</p> <p>5) Aerobic treatment of effluent after methane fermentation. Continuing the last program.</p>															

(bacteria)

(mold)

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CONT)

FISCAL YEAR	1984			1985											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
(2) Processing 1) Test for Reduction of enzyme consumption															
1)-1 Alpha - Amylase 1)-2 Alpha - Amylase, and Gluco - Amylase															
2) Test for Reduction of Steam consumption															
2)-1 Low Temperature Cooking Process (Preliminary)															
2)-2 Low Temperature Cooking Process (Depends on the result of 2) - 1)															
(3) Improvement Working															

Purchase Order

Construction

Test

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CONT)

FISCAL YEAR ITEM	1984			1985											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
3. Social and Economic Study															
(1) Social impact analysis															
1) Field survey -3															
2) Data adjustment & analysis															
3) Arrangement of report															
(2) Plant Operation Economics															
1) Data Collection															
2) Data Analysis															
3) Arrangement of report															
(3) Micro - Computer															
1) Data analysis for the field survey															
2) Training for BPPT Staff															

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### III) Measures to be taken by both sides

Both sides agreed to make the maximum effort in order to fulfill the agreed annual work plan, and will take the following measures.

#### 1. General

- i) In the monthly meeting, schedule of the cooperation activity should be discussed in advance to avoid unnecessary friction among people concerned.
- ii) Budget for the BERDC should be discussed at least once a year.
- iii) Maximum effort should be made by BPPT to quicken the necessary decision making in course of the implementation of the project.

#### 2. Raw material cultivation

- i) Indonesian side should take over and carry on the task in the annual work plan in the absence of long term expert.

#### 3. Alcohol production

##### 1) Basic research

- i) Both Indonesian counterparts and Japanese experts should jointly produce reports and in this connection, Japanese experts should make adequate guidance on report writing to the counterparts.

##### 2) Processing

- i) Both sides should cooperate for the plant improvement.

#### 4. Social and Economic Study

- i) To accomplish the social impact analysis within the time limit the Indonesian side should provide more staff.
- ii) Both sides should try to realize the dispatch from Japan of a survey team on "The marketing and distribution system of ethanol as fuel in Indonesia".

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#### IV) Understanding on the Plant Improvement

##### 1. Purpose

- 1) To improve the plant in order to get about 8 kl/day 95 vol% alcohol through continuous plant operation for 7 days with cassava as feed stock.
- 2) Although the problem such as low temperature cooking process, quality of alcohol and others are principally excluded from the purpose of above improvement, these problem will be taken care of as much as possible within the budget limitation.

##### 2. Responsibilities of both sides

- 1) Maximum efforts should be made to attain the above mentioned purpose as far as the budget allows by consultant and general contractor.
- 2) Since this plant has already been granted to the Indonesian Government and also the technical cooperation by Japanese Government has been already going on, the Indonesian side and Japanese technical cooperation team will offer complete cooperation to the consultant and general contractor for this improvement work.
- 3) In the stage of trial test operation, Indonesian side, Japanese technical cooperation team and the consultant/general contractor should mutually cooperate for this operation.  
Specific items for this cooperation are as follows.

###### i) Indonesian side

- To make the planning for trial test operation
- To assign appropriate counterpart personnel
- To secure sufficient operators
- To provide manpower for plant maintenance
- To provide materials needed

###### ii) Japanese technical cooperation team

- To make necessary guidance to the counterpart personnel
- To train the operators
- To coordinate among the parties concerned in this operation

###### iii) Consultant and general contractor

- To make necessary adjusting works in order to attain the purpose during the test operation

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### 3. Technical detail of improvement work

BPPT, JICA, technical cooperation team and JICA technical guidance team studied the items of improvement work on the basis of the request letter from BPPT. As the result of discussion, the following items, in accordance with the request letter, are considered adequate.

#### 1) Crushing process

- i) Installment of ampere meter and water flow meter for crusher-2, K-108.
- ii) Installment of ampere meter and pressure gauge, and replacement of thermal switch for cassava pump, P-101.
- iii) Increase of pipe diameter for cassava slurry transfer line.

#### 2) Distillation process

- i) Installment of by-pass line for screen filter, K-202.
- ii) Installment of agitator for broth tank, D-204.
- iii) Replacement of broth pump, P-203.
- iv) Additional installation of pre-heater, E-301.
- v) Improvement of bottom section of mash column, C-301.
- vi) Installment of pressure reducing valve in steam main line or equivalent alternative.
- vii) Modification of cascade control between temperature controller, TIC-307 and steam flow controller, FIC-303.

#### 3) Others

- i) Installation of steam flow meter for cooking tank, D-102.
- ii) Replacement of oval flow meter, FQI-310 for product alcohol.
- iii) Installment of thermometer in reflux line.
- iv) Installment of agitator for waste water tank, D-303.

Then, as to the necessity of work items for the before mentioned low temperature cooking process development, urgent operation test in the plant is recommendable.

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参考資料－ 6

バイオマスエネルギー研究開発

協力事業巡回指導調査団（第 2

次）会議議事録（昭和60年12月）



MINUTES OF MEETING BETWEEN THE TECHNICAL GUIDANCE  
TEAM FOR THE BIOMASS ENERGY RESEARCH AND DEVELOPMENT CENTER AND  
THE AGENCY FOR THE ASSESSMENT AND APPLICATION  
OF TECHNOLOGY OF THE REPUBLIC OF INDONESIA

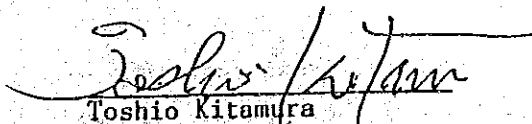
The JICA technical Guidance Team for the Biomass Energy Research and Development Center (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Toshio Kitamura, Director of Mining and Industrial Development Cooperation Department, JICA, visited the Republic of Indonesia from December 11, to December 19, 1985 for the purpose of :


- a. Evaluation of the performance in the past of the Biomass Energy Research and Development Center Project.
- b. Working out the annual work plan of the Biomass Energy Research and Development Center Project.
- c. Establishing the necessary measures for the good implementation of the Biomass Energy Research and Development Center Project.

During its stay in Republic of Indonesia, the Team exchanged views and had a series of discussion with the officials of the Agency for the Assessment and Application of Technology hereinafter referred to as "BPPT" headed by Dr. Ing. Wardiman Djojonegoro in respect of the desirable measures to be taken by both sides for the succesfull implementation of the above mentioned project.

As the result of the discussion, both parties agreed to recommend to the respective government upon the annual work plan and mutual understanding on measures to be taken by both sides as referred to in the document attached hereto.

Jakarta, December 18, 1985

  
Toshio Kitamura  
Leader,  
Japanese Technical Guidance  
Team,  
Japan International  
Cooperation Agency

  
Dr. Ing. Wardiman Djojonegoro  
Deputy Chairman for Administration,  
Agency for the Assessment and  
Application of Technology



ATTACHED DOCUMENTS

1. AGENDA
2. DISCUSSION

1. Agenda

- 1-1 General subjects to be improved
- 1-2 Evaluation of the performance of the project in the past and identification of problems
- 1-3 Annual work plan from January 1986 to October 1986
- 1-4 Measures to be taken by both sides

2. Discussion

2-1 General subjects to be improved Japanese side pointed out the subjects to be improved by Indonesian Government for the successful implementation of the project.

And Indonesian side gave reply and comments for that. The contents of the discussion are as follows.

2-1.1 Scope of BERDC project

- The team

. What is the general scope of BERDC project ? In relation with that, are there any change in National Alcohol policy ?

- BPPT

There is not any change in the basic policy of National Alcohol project. Oil prices are going down and the situation is much different from the beginning of project. But "Fermentation" is one of main doctrine in national research projects. Therefore our general conception is to develop BERDC to become the first fermentation research center in Indonesia.

2-1.2 Budget allocation

- The team

It is important to allocate adequate budget to the project. We would like to grasp the future budget plan in detail.

- BPPT

We are not sure because the annual budget in fiscal year 1985 - 1986 will be approved in February 1986. And there seems to be much difference between the amount of requested budget and authorized budget. We will make effort to get adequate budget for the future.



### 2-1.3 Staff allocation

- The team

In the present condition, counterparts allocation for Japanese experts is not sufficient and some of them are not fixed in BERDC. We request to Indonesian side to get sufficient counterparts fixed.

- BPPT

We are fully aware this disappointing matter. However, it is not easy to recruit the right persons for the positions in BERDC and to fix them so long time.

### 2-1.4 Relationship between Pago farm and agricultural field of BERDC

- The team

According to the organizational chart of BPPT, Pago farm is one of the project under PPE & PE same as BERDC.

What is the concept of relationship between Pago farm and agricultural field of BERDC.

- BPPT

Both Pago farm and BERDC should cooperate with each other. If possible, Pago farm will supply raw material for the pilot plant in future. But we have no budget to proceed the Pago farm plan, now.

### 2-1.5 Opening ceremony of BERDC

- The team

We take much interest as to when the opening ceremony of BERDC is scheduled to take place as one of the established organization.

- BPPT

We also think it important to have an opening ceremony of BERDC. However, under the present circumstances it is very difficult to decide the exact date if we ask the attendance of the Minister. At present, we can not say any definite promise with respect to the opening ceremony.



## 2-2 Evaluation and comments

Both sides reviewed the performance of each item of technical cooperation subjects from the beginning of the project, October 1982 as referred to the Annex I and found out some problems.

The important comments and problems are as follows :

### 2-2.1 Raw material cultivation

- i. Both sides agreed that Japanese technical cooperation program was almost finished with the termination of LTE, July 1985. And after that, technical guidance of soil analysis method, the left subject, was carried out by STE.
- ii. Basic design for irrigation and drainage of the experimental field was made with the help of STE in 1984 but their actual installation has not been done.

### 2-2.2 Alcohol production

#### 1. Basic research

- i. Japanese experts have transferred the Indonesian counterpart the basic method of experiment satisfactorily.
- ii. In the subject of methane fermentation of distillery waste, Japan has not yet provided 100 l methane fermentor.
- iii. Regarding fermentation of other raw material such as Sago palm, Nipa palm, it is very difficult for Japanese experts to give guidance to counterpart because of no experience in Japan.
- iv. In the subject of basic research on cellulose saccharifying process, purification of enzyme has not been done by Japanese experts, Indonesian side claimed. Against that, Japanese side explained that the meaning of this subject was understood more broadly, not so specifically as Indonesian side said.

#### 2. Processing

- i. Improvement work of the pilot plant has successfully finished.



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ii. Both sides confirmed that Indonesian counterpart and operator has learned the technical standard of plant operation satisfactorily with the advice of Japanese experts.

iii. Fermentation of other raw material is impossible because of mechanical function of the pilot plant and no experience in Japan.

2-2.3 Social and economic study.

i. Both side agreed that Japanese cooperation on this subject was completely done by 1 LTE and 2 STE.

3. Annual work plan from January 1986 to October 1986.

3-1 Indonesian side requested on the dispatch of experts on research laboratory as follows :

1. STE : Ethanol fermentation using starchy material without precooking (Koji Extract).
2. STE : Ethanol fermentation with yeast recycling process.
3. STE : Ethanol production by flash continuous fermentation process.

3-2 Both sides agreed to the annual work plan as referred to in the Annex II according to the evaluation mentioned above.

4. Measures to be taken by both sides.

Both sides agreed to make the maximum effort in order to fulfil the agreed annual work plan, and will take the following measures (refer to Annex I).

4-1 Raw material cultivation.

- i. Japanese back-up committee should give advice to the Indonesian side if technical problems occur.
- ii. Indonesian side should carry out installation work of irrigation and drainage system.



4-2 Alcohol production.

1. Basic research

- i. Japanese side will provide 100 l methane fermentor as soon as possible.
- ii. Both sides agreed that the subject of fermentation of other raw material must be eliminated in future because of no experience in Japan.
- iii. Non-cooking process will be scaled up with 200 l jar fermentor.
- iv. Japanese side should dispatch short term experts in the following field
  - Continuous fermentation by conventional process and immobilized yeast process.
  - Basic research on cellulose saccharifying process.
  - Methane fermentation of distillery waste.
  - Mash column.



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EVALUATION OF PERFORMANCE IN THE PAST AND MEASURES TO BE TAKEN BY BOTH SIDE IN FUTURE - BY EACH ITEM OF TECHNICAL TRANSFER SCHEDULE  
(remarks) LTE : Japanese Long Term Expert STE : Japanese Short Term Expert C/P: Indonesian Counterpart Personnel

SPECIFIC ITEMS	YEAR	PERFORMANCE IN THE PAST	EVALUATION	MEASURES TO BE TAKEN
				BY JAPANESE SIDE   BY INDOONESIAN SIDE
<b>I. RAW MATERIAL CULTIVATION</b>				
1) Preparation of experimental field				
a Survey on condition of soil, irrigation, drainage and etc.	1983 - 1985	* Soil analysis method was transferred by STE. * Basic design for irrigation system was made by STE.	* C/P has reached the certain level of soil analysis method. * The actual installation of irrigation and drainage facilities has not been done.	* Research Continuously * Installation work of irrigation and drainage system
b Arrangement of the experimental field for cultivation.	1983 - 1985	* The reclamation work of experimental field was extended to 5 block, more than 7 ha under the guidance of LTE.	* Sufficient area of field was arranged, and C/P acquired the basic skill.	* Continuous management of the experimental field
2) Variety collection and verifying test				
a Collection of local varieties and their data	1983 - 1985	* Total 141 of pedigrees of sweet potato were collected under the guidance of LTE, from Lampung region, Bogor, Tawang Mangu and so on.	* Enough pedigrees for verifying test were collected.	* Continuous collecting work for finalizing out of suitable line
b Verifying test of varieties collected	1983 - 1985	* 72 pedigrees of collected 141 were made variety test and comparative analysis. As a result of that, several suitable lines of sweet potato had been selected.	* LTE has transferred the basic testing method completely.	* Research Continuously for cultivation at the experimental field
c Comparative analysis on the results of verifying test conducted				
d Selection of appropriate varieties for cultivation				
3) Study on cultivation method				
a Study on the prevailing cultivation method	1983 - 1985	* Three times trial cultivation of sweet potato was carried out at the experimental field under the guidance of LTE.	* C/P acquired the basic cultivation method, and came to carry out by themselves.	* Trial for continuous cultivation
b Study on appropriate cultivation method using the selected varieties				
c Analysis of the results of the mentioned cultivation methods & its reporting		* Technical Transfer on the operation and maintenance of agricultural machineries provided by JICA was done with the help of STE.	* STE transferred the technique completely.	* Maintenance of agricultural machineries

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SPECIFIC ITEMS	YEAR	PERFORMANCE IN THE PAST	EVALUATION	MEASURES TO BE TAKEN BY JAPANESE SIDE	MEASURES TO BE TAKEN BY INDONESIAN SIDE
<b>II. ALCOHOL PRODUCTION</b>					
1) Basic research					
a Survey and screening of yeast High Temp. tolerant Low pH tolerant Alcohol tolerant	1983 - 1985	* Screening and selection of high temperature, low pH, alcohol and sugar tolerance yeast were carried out with the help of STE. * LTE continues the experiment for screening and selection of yeast.	* C/P acquired the experimental method for screening and selection of yeast.	- ditto -	* Research Continuously.
b Determination of the optimum condition for liquefying and saccharifying and fermentation of cassava and sweet potato.	1983	* Concerning the material of cassava, STE conducted the experiment of fermentation with 30 l jar-fermentor.	* Technical transfer of conventional fermentation has completed.		
c Methane fermentation of distillery waste	1983 - 1985	* Beaker test was carried out by STE. * LTE continues the experiment.	* Experimental method was completely transferred to C/P.	* Provision of Methane Fermentor (100 l) * Dispatch of STE (1 month) **	* Selection of stationary position of Methane Fermentor * Preparation of utility (electricity, water, drainage and so on)
d Survey and screening of liquefying and saccharifying enzyme producing microbe	1983 - 1985	* Beaker test and guidance of experimental method were carried out by STE. * LTE conducted the continuous research.	* Experimental method of screening was completely transferred to C/P.	* LTE should give advice to the Indonesian side if necessary.	* Research Continuously.
e Aerobic treatment of effluent after methane fermentation.	1984 - 1985	* Continuous experiment has been carried out with 2 l jar fermentor by LTE.	* C/P acquired the basic technique of aerobic treatment.	* Scale up test with Methane Fermentor to be provided by JICA	* Research Continuously.

\*\* Make maximum effort to realize

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SPECIFIC ITEMS	YEAR	PERFORMANCE IN THE PAST	EVALUATION	MEASURES TO BE TAKEN BY JAPANESE SIDE	MEASURES TO BE TAKEN BY INDONESIAN SIDE
f Low-temperature cooking process (70-90 C)	1983	* Basic experiment with 30 l jar-fermentor was carried out by STE	* Technical transfer of labo-level has been already done.		
g Improvement of microbe strain	1985	* STE made an experiment for improvement of microbe strain by the method of irradiation of ultraviolet ray	* Experimental method was completely transferred to C/P.	* LTE should give advice to the Indonesian side if necessary.	* Research Continuously.
h Determination of the optimum condition for liquefying, saccharifying and fermentation of other raw material (Sago-palm, Nipa-palm etc)		not yet tried		(comments) * This item of research for sago is being conducted at the research center in Serpong. * Accordingly, this item must be eliminated in future.	
i Submerged culture of liquefying and saccharifying enzyme producing microbe	1985	* Culture research was conducted with 200l jar-fermentor by 2 STE	* Technical transfer of 200 l jar-fermentor operation was finished	* Continuous research by LTE	* Research Continuously
j Basic research on cellulose saccharifying process	1985	* Experimental guidance was carried out by STE (Screening of cellulase producing fungi)	* C/P acquired the basic experimental method.	* Dispatch of STE (1 month)**	* Research Continuously
k Continuous fermentation by conventional process and immobilized yeast process		not yet tried		* Dispatch of STE (1 or 2 months)	
l Non-cooking process	1985	* Basic experiment with 30l jar-fermentor was carried out by STE	* Experimental guidance was completely done	* Scale up test with 200 l jar-fermentor by LTE	* Research Continuously * Preparation of enzyme

\*\*) Make maximum effort to realize



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SPECIFIC ITEMS	YEAR	PERFORMANCE IN THE PAST	EVALUATION	MEASURES TO BE TAKEN BY JAPANESE SIDE	MEASURES TO BE TAKEN BY INDONESIAN SIDE
(2) Processing					
a Confirmation of technical standard in pilot plant	1983 - 1985	* LIE and STE instructed a series of operation system of the pilot plant.	* C/P and operators fully mastered standard operations procedure of pilot plant.	* LIE should give advice to the Indonesian side if necessary.	* Making out the operation schedule of pilot plant
b Low-temperature cooking process (70-90 C)	1984	* Low-temperature cooking process was tried in the 11th test run	* Possibility of low-temperature cooking process in the plant was confirmed.	- ditto -	* Making out test plan of the process
c Fermentation of other raw material (Sago-palm, Nipa-palm etc.)		not yet tried		* (comment) In Japan, there is no experience to use those materials. Accordingly, this item of technical cooperation must be eliminated in future.	
d Non-cooking process		not yet tried		* Scale-up test with 200 l jar-fermentor by LIE	* Research continuously preparation of zym
e Methane fermentation of distillery waste		not yet tried		* Provision of Methane Fermentor (100 l) * Dispatch of STE ( 1 month ) **	* Selection of stationary position of Methane Fermentor * Preparation of utility (electricity, water, drainage and so on)

\*\* Make maximum effort to realize

(CONTINUED)

SPECIFIC ITEMS	YEAR	PERFORMANCE IN THE PAST	EVALUATION	MEASURES TO BE TAKEN BY JAPANESE SIDE	MEASURES TO BE TAKEN BY INDONESIAN SIDE
III. SOCIAL AND ECONOMIC STUDY					
1) Social impact analysis a Field survey b Data adjustment c Arrangement of report	1983 - 1985	* LTE conducted field survey 3 times, and arranged the report.	* Duty of LTE was finished on schedule		
2) Plant operation economics a Data collection b Data analysis c Arrangement of report	1985	* LTE conducted data collection and analysis about plant operation economics.	-ditto-		
3) Micro-computer a Data analysis for the field survey b Training for BPPT	1984 - 1985	* The result of above mentioned field survey was analyzed with micro-computer by STE. * The STE trained C/P to utilize the micro-computer.	* System analysis method with the help of micro-computer was successfully trained to C/P.		

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ANNUAL WORK PLAN FROM JANUARY 1986 TO OCTOBER 1986

FISCAL YEAR	1986														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
I T E M															
I Indonesian Side															
(1) Staff Recruitment															
(2) Acquisition of Necessary Budget for this Project															
II Japanese Side															
(1) Dispatch of Experts															
1) Long Term Experts															
* Chief Advisor (Research of Alcohol Production)															
* Plant Operation															
* Plant Maintenance															
* Coordinator															
2) Short Term Experts															
* Continuous fermentation by conventional process and immobilized yeast process															
* Basic research on cellulose saccharifying process															
* Methane fermentation of distillery waste															
* Mash column (Maintenance)															
(2) Training of Indonesian Counterpart Personnel in Japan															
(3) Provision of Equipment															



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RESEARCH PROGRAM IN THE CENTER

remarks : (i) - by Indonesian Side. (i)(j) - Technical Transfer by the Japanese Experts

FISCAL YEAR	1985					1986									
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
1. Raw Material Cultivation															
(1) Preparation of Experimental Field															
1) Survey on condition of soil, irrigation drainage and etc.											(1)				
2) Arrangement of the experimental field for cultivation											(1)				
(2) Variety collection and verifying test															
1) Verifying test of varieties collected											(1)				
2) Comparative analysis on the results of verifying test conducted											(1)				
3) Selection of appropriate varieties for cultivation											(1)				
(3) Study on cultivation method															
1) Study on the appropriate cultivation method											(1)				
2) Analysis of the results of the above mentioned cultivation method and its reporting											(1)				
(4) Research on continuous cropping and rotation system and its reporting											(1)				
(5) Research on the improvement of soil fertility											(1)				

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FISCAL YEAR	1985					1986									
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
I T E N															
2. Alcohol Production															
(1) Basic Research															
1) Survey and screening of yeast											(1)				
2) Methane fermentation of distillery waste											(1) (j)				
3) Survey and screening of liquefying and saccharifying enzyme production microbe											(1)				
4) Aerobic treatment of effluent after methane fermentation											(1) (j)				
5) Improvement of microbe strain											(1)				
6) Submerged culture of liquefying and saccharifying enzyme producing microbe											(1) (j)				
7) Basic research on cellulose saccharifying process											(1) (j)				
8) Continuous fermentation by conventional process and immobilized yeast process											(1) (j)				
9) Non-cooking process											(1) (j)				
(2) Processing															
1) Confirmation of technical standard in plant operation											(1) (j)				
2) Low-temperature cooking process (70 - 90 °C)											(1) (j)				
3) Methane fermentation and aerobic treatment of effluent in pilot plant											(1) (j)				
4) Maintenance of the plant											(1) (j)				

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