

農林協力部 (田中)

保管

JAPAN'S TECHNICAL COOPERATION  
For  
AGRICULTURAL DEVELOPMENT  
IN  
INDONESIA

June 1972

DJAKARTA

THE OVERSEAS TECHNICAL COOPERATION AGENCY  
OF  
JAPAN

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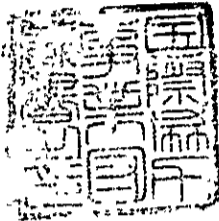
Japan's Technical Cooperation  
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Overseas Technical Cooperation Agency  
of  
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## PREFACE

Japan's technical cooperation to Indonesia on the governmental basis dates back to 1954 when Japan joined the Colombo Plan.

The technical cooperation took the form of accepting trainees from Indonesia and providing the services and surveys for development project.

Later, as a result of efforts to extend further the scope and volume of technical cooperation between the two countries, the area of cooperation was expanded so as to include project-type technical cooperation in the fields of agricultural and medical cooperation and also to enable the donation of equipment.

Out of the total amount of Japanese technical aid to developing countries which is planned to reach US\$33 million in 1972, Indonesia now receives by far the biggest share of about US\$3 million, nearly 10% of Japan's total technical aid.

In Japan's technical aid to Indonesia, agricultural cooperation occupied an important place in terms of the number of experts dispatched, the amount of machinery and equipment provided and the number of fellowship awards for advanced training in Japan.

This is because the Indonesian Government has given a top priority to the increase of agricultural production during the current Five-Year Development Plan.

The Japanese Government has assisted the Indonesian Government in establishing four project-type technical cooperation projects in the field of agriculture. They are 1) West Java Food Crop Production Project (Tjibe Tani Malmur Project), 2) Maize Project East Java, 3) Joint Food Crop Research Program, 4) Tadjum Agricultural Pilot Scheme.

The Japanese Government also plans to help the Indonesian Government to set up a new project in Lampung province, South Sumatra.

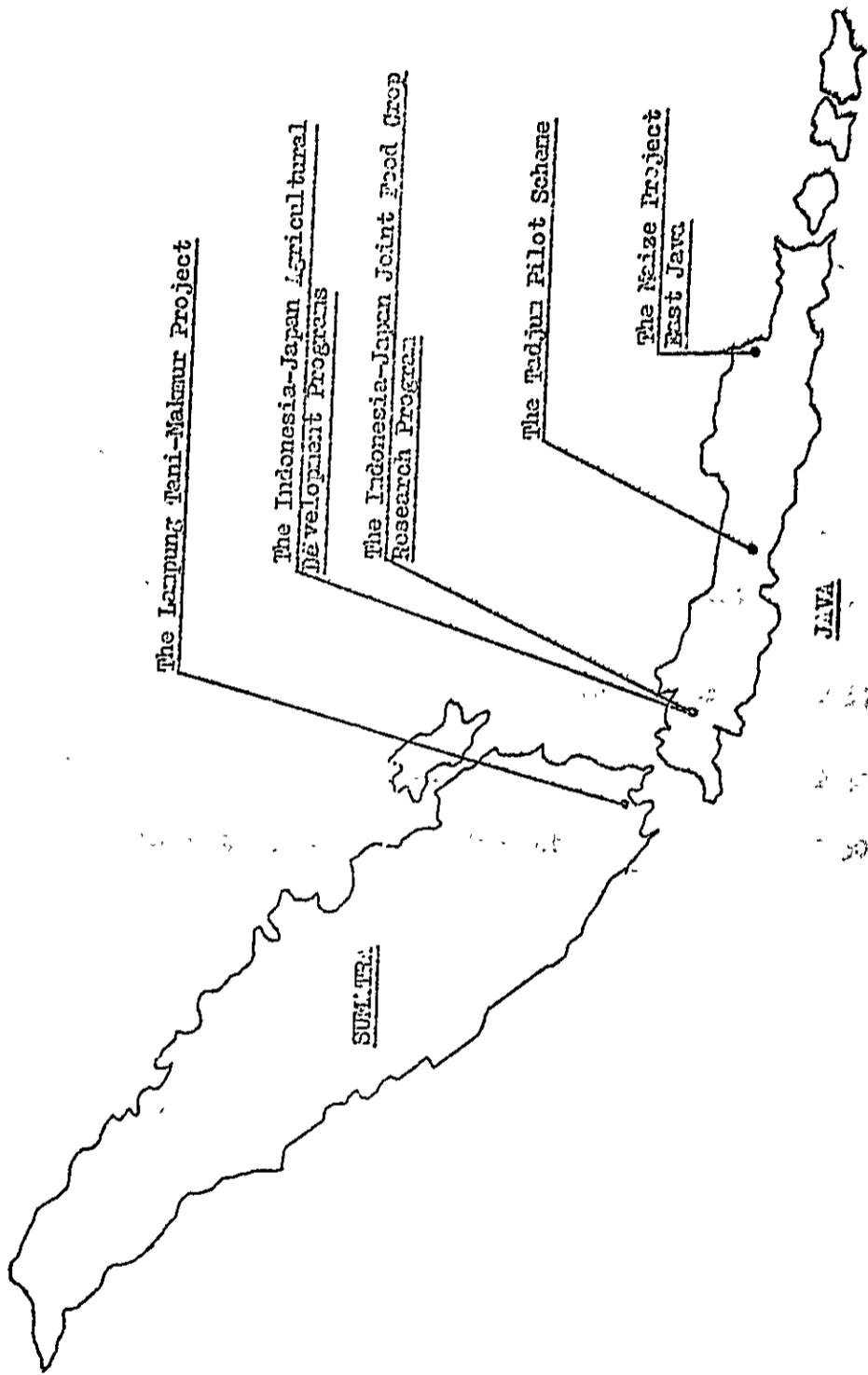
This booklet is designed to give a brief information on the outlines of each project mentioned above, with a view to providing understanding on agricultural technical cooperation between the two countries.

Teizo Sugiyama  
Representative  
O.T.C.A. Djakarta Office

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The Lampung Tani-Makmur Project

The Indonesia-Japan Agricultural Development Programs

The Indonesia-Japan Joint Food Crop Research Program

The Tadjudum Pilot Scheme

The Reize Project East Java

SUM. TR.

JAVA

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## THE MAIZE PROJECT EAST JAVA

### **1. OUTLINE OF THE PROJECT**

- 1. Name**           The Maize Project East Java
- 2. Locations**   Karesidanan Malang, Kediri and Besuki  
                  Surabaya   Djawa Timur
- 3. Date of the Agreement**

The Record of Discussion was signed on the 16th of December 1967 for the period of three years ( April 1968 - March 1971 ).

And it was renewed on the 2nd of April 1971 for the period of another three years ( April 1971 - July 1974 ).

#### **4. Aims**

For the development of Maize in the Province of East Java, Indonesia ( Kediri, Malang, Lumadjang, Bondowoso, Banjuwangi ), the two Governments will jointly carry out the following technical cooperation in the Area and at the Centres.

- (1). Technical advice to the farmers in the Area on the improvement of Agricultural techniques such as cultivation method, fertilizer application, plant protection to increase maize production.
- (2). Technical advice to Agricultural Cooperative associations and other organizations related to the Maize Project on improving the quality of maize for export such as drying, processing, fumigation, grading and storage.
- (3). Technical advice on rationalizing marketing system for export through the establishment and promotion of the marketing organizations among agricultural cooperative associations.
- (4). Facilitating business transactions of maize between the two countries.
- (5). Applied research and experiment to improve agricultural technique and management, applicable to the Province of East Java in line with and within the frame work of the National Research Program in Indonesia.
- (6). Production and distribution of foundation seed, stock seed and extension seed for the Maize Project in line with and within the framework of the National policy and program on the development of a sound seed industry in Indonesia.
- (7). Training of Indonesian officials, members or leaders of agricultural cooperative associations and key-farmers associated with the Maize Project.

2. Experts

<u>Name</u>	<u>Specialty</u>	<u>Term of Duty</u>
Y. TAMURA	Team Leader	June 1972 - July 1974.
T. FUKUZATO	Production technique ( Extension )	Aug. 1970 - Aug. 1972.
S. HIROSE	Breeding	Dec. 1970 - Dec. 1972.
H. SAKAMOTO	Agronomist	Mar. 1971 - July 1974.
M. MORITA	Farm Machinery	Mar. 1971 - July 1974.
Y. YOSHIKUMI	Processing	July 1971 - July 1974.
E. KOCHI	Marketing	July 1971 - July 1974.

6. Counter-parts

<u>Name</u>	<u>Specialty</u>
1. Ir. Martono Soeronegoro	Project Leader
2. Ir. Sadroen Martoatmodjo	Production
3. Mr. Soedewo	Food-stuff section
4. Mr. Soetarto	General Coordinator
5. Mr. Iskamar Winoto	Fumigation
6. Mr. Soepojo Rahardjo	Social Economy
7. Mr. Adimoeljo	Marketing
8. Mr. Dardjoko	Statistics
9. Mr. Teguh Soegianto	Bureau of Technique
10. Mr. Rekanto	Mechanization
11. Ir. Achmad Djazuli	Quality Control
12. Mr. Slamet Tjitrowijoso	Plant Protection
13. Mr. Koesmadi Soemowijoto	Bureau of Extension
14. Mr. Pramono Soegito	Education
15. Mr. Soewito	Information
16. Mr. Soetarjadi	Extension System



(1) Commodities received from the Government of Japan O.T.C.A. (Colombo Plan)

<u>1968/1969</u>	<u>27,059 ( 1000 ¥ ) U.S. \$ 88,000,--</u>	
U r e a	120 M/ton	
Toyota Land Cruiser	hardtop model F; 40 V	1
Toyota Land Cruiser	station wagon	1
Toyota Truck	6 ton	2
"-	3.5 ton	2
Kubota 4 wheel Tractor	L - 35 R.P.	1 set
"-	L - 200 R.B.	3 set
Moisture meter etc.		

<u>1969/1970</u>	<u>21,156 ( 1000 ¥ ) U.S. \$ 69,000,--</u>	
U r e a	620 M/ton	
T.S.	26 M/ton	
Cornsheller		5 set
Dryer		1 set
Ieuzu ELF	double cabin truck	1
Plat-form scale		4 set
Motor Cycle	Honda 90	5
Corn cutter and others		4 set

<u>1970/1971</u>	<u>39,854 ( 1000 ¥ ) U.S. \$ 129,000,--</u>	
U r e a	600 M/ton	
Toyota Land Cruiser		5
Farm Tractor	L - 350	2 unit
Dryer	Model F E - 97	3
"-	Model F D - 77	3
Elsan dust		3 ton
Honda Motor Cycle	Model - S 90	20 unit
Portable typewriter		1
Electric calculator		1
Rain Gauge		1
Moisture meter		10
Corn sheller		5

(2) Commodities Allocation under the KENNEDY ROUND FOOD AID of the  
Government of Japan.

<u>1968/1969</u>	<u>101,213 ( 1000 ¥ )</u>	U.S. \$ 329.000,--
Grain dryer	Horizontal Iseki	10
Corn dryer	IHI Vertical + 10% S.p.	30
Power Corn Sheller	IHI	30
Corn Sheller	IHI	10
Corn Sheller	Hand operated	60
Truck	3 ton	8
Spare parts	10%	10%
Truck	1 ton	5
Knap Sack	Sprayer & 10% S.P.	22
Power Mist	Blowers & 10% S.P.	1
Hand Dusters		85
Fumigation Equipments		10
Seed Equalizers		4
Plat-form balance	100 kg	8
Plat-form balance	500 kg	8
Grain moisture tester		10
Soil Moisture tester		10
P.H. meters		10
Thermo hydrometer		4
Battery charger		4
U r e a		1.820 ton
Compound		500 ton
Potassium Sulphate		250 ton
Fumigant (Methyl Bromide)		2.620 ton
Diazinon		2.750 ltr.

<u>1971/1972</u>	<u>50,000 ( 1000 ¥ )</u>	U.S. \$ 162.000,--
U r e a	1300 ton	
Toyota Land Cruiser		4
Micro Bus		1
Processing Equipment		5
Winnowing		10
Plane table		4 set
Electric calculator		4
Rioch Electric Ricopy		1
Filing Cabinet		4
Storage Cabinet		4
Rotary hand duster		5
Power duster Mister		13
Typewriter		4

## II. ACTIVITIES OF THE PROJECT

### 1. The Record of the Past Activities.

The Maize Project East Java was implemented in accordance with the Record of Discussion between the Government of Japan and the Government of the Republic of Indonesia c.q. the Department of Agriculture, signed on the 16<sup>th</sup> of December 1967 for the period of three years (April 1968 - March 1971).

#### (1) Policy and Organization

For the period of 1968/1969 there were 5 experts appointed at the Diperta namely:

1. H. KOMURO : Team Leader as well as Quality Control expert.
2. K. YASUDA : General Planning.
3. T. CHIHIZU : Marketing and Cooperative.  
(from ZEPKORUM; JAPAN)
4. N. SUGA : Production.
5. S. YAMAZAKI : Production.

They had the function of an advisory group to this Project, in which 3 persons (No. 1, 2 and 3) stayed in Surabaya (at the office of Diperta Province) and 2 persons (No. 4 and 5) stayed in Malang (Office of Diperta Karosidenan).

In the implementation, the farmers is given fertilizer, seed and technical guidance by the Project, while after the harvest the farmers are entitled to submit the Project a part of their production and a certain amount for compulsory saving for the Koperta (Agricultural Cooperative). All these yield after being collected, will be exported by GAKOPERTA (the Provincial Federation of Agricultural Cooperative Associations and "GADJAH MUDA" in East Java on behalf of the Maize Project East Java. As an exporter, Gakoperta receives service-fee from the Project in the framework of the supervision for its growth and development.

As to the profits; either from the export or from the local sale, in accordance with the record discussion it is returned to the Project to be utilized for the growth and development of the Project either within the period of the Aid or even after this Colombo Plan is over.

The income of the compulsory savings at the Koperta will be used for the development of the Koperta and its members.

By the existence of this compulsory savings it is hoped that later on, Koperta could supply themselves the production requisite needed by the members.

REPAYMENT SYSTEM OF THE PROJECT

The system of the repayment in year 1970/1971 was as follows;

The Project gave farmers (per ha.)

Fertilizer 200 kg of Urea

seed 25 kg of superior seed

technical guidance.

The repayment from farmers

450 kg maize kernels as the repayment for fertilizer

25 kg " " as " " for seed

25 kg " " as " " for warehouse

Total 500 kg

Basically the system of the repayment remains the same for three years. Only it was simplified by hearing the idea of the Projects participants, and by their habits.

(2) Collection of the Production and Export.

Based on the formula of repayment mentioned above, the farmers participated in the Project should submit their maize production after harvest, to the Primary Koperta corresponding to the contract.

The Primary Koperta as the processor. Processes the maize and sends then to the Koperta Centre or to the warehouse of the Diperta as the processing centre (Done by Koperta).

Sometimes, the Primary or the Centre of Koperta asked the private processor, because of the lack of their processing facilities.

The collection from the farmers could be in the form of ear-corn without husk or in harvest dry maize kernels (moisture contents ear corn  $\pm$  40%, harvest dry kernels 35%). The ratio from ear-corn to kernels is decided as 55 - 60%. When the submittance is in ear-corn, the ratio is 50% the 5 to 10% is considered as the processing fee (1 qt ear-corn = 50 kg kernels).

When the processing in the region does not meet with the condition of quality for export, the maize is reprocessed in Surabaya, before it is exported. The standard quality for export is as follows;

- a. Moisture contents :  $\pm$  14.5 %
- b. Damaged kernel :  $\leq$  5 %
- c. Broken and foreign materials :  $\leq$  5 %
- d. Other classes :  $\leq$  3 %

When, after the reprocessing, the quality obtained is still under that, for export, the maize is sold locally.

The maize to be exported is delivered to the end of July 1971 from Surabaya.

MANIFESTED AREA AND REPAYMENT OF THE PROJECT

YEAR 1968/1969.

KABUPATEN	Harvested area (Ha)	Repayment project target (kg)	Repayment from farmers (kg)	Average yield ton/y	S o l d	
					Export	Local
Kediri	200	100,000	100,000	29.5		
Malang	40.3	20,150	20,150	28,0	260,000 <sup>X)</sup>	
Lumadjang	100	40,000	40,000	28,1		
Banjuwangi	218	109,000	109,000	26,1		190,000
<b>T o t a l</b>	<b>550.3</b>	<b>269,150</b>	<b>269,150</b>	<b>2.781</b>	<b>260,000</b>	<b>190,000</b>

YEAR 1969/1970

KABUPATEN	Harvested area (Ha)	Repayment project target (kg)	Repayment from farmers (kg)	Average yield ton/y	S o l d	
					Export	Local
Kediri	1608.9	886,673	593,654	26.9	410,401 <sup>+) )</sup>	153,439
Malang	349.5	189,782	143,050	26.7	91,400 <sup>+) )</sup>	32,595
Banjuwangi	1815.1	903,647	362,616	26.0	362,616	238,444 <sup>X)</sup>
<b>T o t a l</b>	<b>3853.5</b>	<b>11,980,302</b>	<b>11,099,320</b>	<b>26.646</b>	<b>11,102,861</b>	<b>186,034</b>

REMARKS : X) Before the export, reprocessed at the Pijeta Ringa Surabaya.

) Before it was exported, the maize from Kediri and Malang was reprocessed

YEAR at Pijeta Ringa.

YEAR 1970/1971

KABUPATEN	Harvested area (Ha)	Repayment project target (kg)	Repayment from farmers (kg)	Average yield ton/y	S o l d	
					Export	Local
Kediri	1,817.4	878,067	540,075	28.8	515,100	
Malang	1,182.5	564,663	341,096	27.1	289,758	26,100
Lumadjang	100	47,500	47,500	29.0	46,931	
Bondowoso	225	114,902	60,325	28.0	49,811	
Banjuwangi	1,799.3	810,532	342,700	27.2	329,000 <sup>X)</sup>	
<b>T o t a l</b>	<b>5,124.2</b>	<b>2,423,745</b>	<b>1,331,696</b>	<b>2.782</b>	<b>1,230,600</b>	<b>26,100</b>

REMARKS : X) Export to Japan was implemented at the end of July 1971 from Surabaya.-

(3) Training of Indonesian counterparts and member of Agricultural Cooperative.

For four years almost every year we have sent trainees to Japan to master the technique concerning production and marketing.

Now ex-trainees are very active and are leading other officials and farmers in Project areas.

The extrainees and their subject are as follows;

TRAIN EES TO JAPAN

Name of trainees	Year/Month	Subject
<u>1968</u>		
1. Iskamar Winoto	September - December	Fumigation
2. Kambali Soeprapto	September - December	Fumigation
<u>1969</u>		
1. Soetarto Koeswosoehardjo	September - November	Production
2. Ir. Kadijono	"	"
3. Jacobus Soewondo	"	"
4. Alimoen Soekanda	"	"
5. Djoko Sasmito	"	"
<u>1971</u>		
1. Drs. Wagijono Djoewito	July - August	Cooperative
2. Soemardi	"	"
3. D. Soepadrijono	"	"
4. H.M. Maksoem	"	"

2. The State of the Present Activities

The Record of Discussion between the Government of Japan and the Republic of Indonesia was renewed in April 2 1971 for the period of three years ( 1971 - 1974 ).

(1) Bimas Djagung and Maize Project.

In year 1971/72 the Government of East Java Province has put into force the Bimas Djagung (mass guidance of maize) which had a target of 100.000 Ha. The purpose of the Bimas is to increase production of maize by giving cash credit for production requisite, and to promote exportation of maize from East Java.

In Bimas Djagung the farmers is given package credit in cash by B.R.I. (Bank Rakyat Indonesia) and entitled to repay in cash.

The credit of the Bimas includes the cost of living, but that of the Project doesn't include it.

The credit of the Project is the same as previous year.

The difference in credit system between the Bimas and the Project has created many difficult problems.

For example, how can we adjust the difference of the credit system?

How should we discriminate the Project area from the Bimas area?

Which is better for the farmers?. In Kediri and Malang the farmers

prefered the credit system of the Project to that of the Bimas. In Bondowoso, Bonjuwargi they wanted to receive the cost of living because they are so poor.

As the Bimas Djagung has been playing the role of extending credited area, the Project came to stress on giving concentrated guidance to the limited area.

The result of year 1971/72 is as follows :

Annexure of the Bimas Djagung in year 1971/72

Realization of the farmers repayment in year 1971/72 :

Region Kabupaten	Plantet area (Ha)	Damaged area (Ha)	Harvest area (Ha)	Target of repayment (kg)	Realization of farmers' repayment kernels up to May 1972	Ratio (%) of last year	Repayment Ratio (%)	Yield per Ha (Kg)
Kediri	3.197,75	-	3.197,75	1.438.988	951.243	66,1	61,5	1.990
Malang	1.099,25	126,10	973,15	437.917	319.812	73,1	60,4	2.890
Lumajang	312,00	-	312,00	140.400	88.548	63,1	100	2.700
Bondowoso	189,50	8,00	181,50	81.675	25.016	30,6	52,4	4.760
Banjurwangi	1.318,62	263,72	1.054,90	474.705	256.000	53,9	41,9	
<b>TOTAL</b>	<b>6.117,12</b>	<b>397,82</b>	<b>5.719,30</b>	<b>2.573.685</b>	<b>1.640.619</b>	<b>65,7</b>	<b>54,9</b>	<b>2.340</b>



(2) Bimas Palawidja and Maize Project.

In year 1972/73 during rainy season the Central Government has a plan to extend Bimas Palawidja (mass guidance of the second crop including maize) into the whole country. And the Maize Project East Java is decided to belong to the Bimas Palawidja.

In the Bimas Palawidja the Maize Project will be the pilot project to aim at the qualitative development by concentrative guidance. While the Bimas Palawidja will play a role to extend the effect of the Project into larger area.

In other words, the Project should be the qualitative area and the Bimas Palawidja will be the quantitative area.

The credit system of the Bimas Palawidja will be the same as Bimas Djagung.

The credit system of the Project should be the same as the previous year. For four years we have been promoting the agricultural cooperative organization through the credit system.

According to the request of Mr. WAZIR, the Director of Production of Agricultural, we selected the model Primary Cooperatives among the Project area.

Now we are putting emphasis on promoting the model Primary Cooperatives as one of the concentrative guidance in the frame work of Record of Discussion. And we have a plan to set up a Demonstration farm to give concentrative guidance.

The content of Demonstration Farm is as follows.

(a) DEMONSTRATION FARM ( for technical extension exhibition and education ).

(1) Purpose.

To make clear local problem of cultural technique and to give training to the counterparts, key farmers and farm-youths.

(2) Practise.

1. To show the model of standard cultivation for exhibition and extension.
2. To pick up the local problem and carry out adaptation test.
3. To show the method of ploughing by plough and harrow and tractor.
4. Maintenance of soil through soil test.
5. Maintenance of soil capacity by rotation.
6. Farm youth training.
7. Exhibition of the efficiency of weeder.

**(b) MODEL FARM (to grow up a key group).**

**(1) Purpose.**

In setting up a small group of 5 Ha, through concentration guidance, we expect the development of farmers' techniques of maize cultivation, and all the joining farmers can acquire the confidence for the cultivation in themselves.

In making base of group activity and local extension, we expect these group to be a key-group in raising agricultural cooperative.

**(2) Practice.**

1. Unification of variety and harmonious teamwork.
2. Ploughing, harrowing and soil control.
3. Unification of fertilizing.
4. Cooperative use and union control of machinery and equipment.
5. Grow up group.
6. Grow up a farmer to assume leadership.
7. Leadership for farmer.

DEMO FARM

District	Substance	Period	Area Ha	Budget Rp.	
Kediri	1) Variety				Soil rent 50,000
	2) Fertilizer	Sep.-Dec.			Seed 1,000 Fertilizer 15,960 Urea
	3) Population		1.0	100,000	Medicine 3,000 300 kg
	4) Applied farm machinery	Jan.-Apr.			Ploughing 10,000 X 2 Labour 16,000 1.3. Harvest 10,000 100 K
	5) Crop rotation				Investi- gation 5,000 X 2
					Others 9,000
Malang	Schlerospora Survey	Sep.-Apr.	0.2	94,000	
Bondowoso	1) Variety				
	2) Fertilizer each variety	Mar.-Jul.			
	3) Population				
	4) Ploughing test		1.0	100,000	
	5) Crop rotation				
	6) Youth train- ing	Oct.-Feb.			
	7) Schlerospora survey				
	8) Soil analysis				
Banjuwangi	1) Variety				
	2) Fertilizer	Nov.-Feb.	1.0	50,000	
	3) Population	Nov.-Feb.	10.0	100,000	
	4) Agric. machi- nery				
(Sorghum)	1) Trial Product- ion of Sorghum	Mar.-Jun.	0.25	25,000	
	2) Trial Product- ion of soybean	Mar.-Jun.	0.1	10,000	
	3) Mixed cropping	Mar.-Jun.	0.25	25,000	
	4) Variety	Jun.-Oct.	0.25	25,000	

(3) Production and the Maize center.

Since the beginning of our maize project in 1968, there had been many problems to be solved in production, such as harrowing, attainment of superior seed, control of diseases and insect pests, fertilizing and so forth. In order to solve these problems, especially of harrowing, we are still making efforts to promote the tractor cultivation in Banjawangi area, and these to improve traditional plow and harrow.

It is very important to produce enough seeds of good quality for increasing maize production and raising maize quality. To fulfill these purpose the maize production center was established in Malang last year.

One of the purposes of the center is to attain superior seed to release to each project area. So that center is carrying out producing foundation seed stock seed and extension seed under the strict selection procedure,

Speaking about diseases and insect pests, Downy Mildew is now big problem. As it is very difficult to prevent by an using fungicide especially we are giving guidance not to miss the suitable time of planting and to evade the infection of disease as much as possible by planting just after first rainfall,

As it is possible to reduce the damage of Holtorichiahelleri by coating 1% ardmn, we are recommending to avoid the damage by timely planting and seed coating.

About fertilizing to preserve the run-off of fertilizer nutrient by rainfall, we are instructing farmers to practise applying the fertilizer into the hole made by stick and to apply one-third of fertilizer at planting time, two-thirds of fertilizer at 25 - 30 days later.

Plant population, low density of plants per unit area is a great factor for increasing the yield, so we are instructing farmers to attain more than 60,000 plants per ha in adjusting the number of hills and number of plants per hill.

For the purpose of it we put an emphasis on importance of good seedling emergence by using improved plow and cultivator.

In implementing our project, what is most difficult problem is how to overcome the damage of Downy Mildew (*Sclerospora maydis*)

- (a) The production of foundation seed stock seed and extension seed for coming next season is as follows;

Production of foundation seed

Variety	Area(m <sup>2</sup> )	Place and method
Keretek	500	Bodali, artificial sib-crossing
Harapan	250	" "
PS -42	200	" "
Bogor compiste - 2	200	" "
Metro	200	" "
	350	" "
<b>T o t a l</b>	<b>1,900</b>	

The production of stock seed

Project area	Variety	Isolation field	Amount of seed prod.
Kediri	Keretek	0.5 ha	1,000 kg
Malang	Harapan	0.2	400
Lumadjang	PS - 42	0.1	200
Bondowoso	Bogor compostite2	0.1	200
Banjuwangi	Metro	0.4	800
<b>T o t a l</b>		<b>1.30 ha</b>	<b>2,600 kg</b>

The production of extension seed

Project area	Variety	Isolation field	Amount of seed prod. ton
Kediri	Keretek	37.50 ha	75
Malang	Garapan	12.50	25
Lumadjang	PS - 42	2.50	5
Bondowoso	Bogor composite2	2.50	5
Banjuwangi	Metro	25.00	50
<b>T o t a l</b>		<b>80 ha</b>	<b>160 ton</b>

(b) In the maize center, the following training program is scheduled for coming next season.

PROGRAM FOR TRAINING

Period	Aim	Trainee	Course
June - July 2-3 days B. respectively	Before starting the project, to give the instructure and guidance about to managing method of Agricultural primary cooperative etc.	A. Member and Leader of A.P.C. and key-farmer in village. B. Official extension worker	1. General guidance 2. Extension method 3. Managing method and theory of Agricultural Cooperative 4. General Agriculture situation of East Java
August 2 - 3 days for each	Before planting, to give the instruction and guidance about the practise of culture	A. B.	1. Planting method 2. Soil conservation 3. Field management 4. Machinery 5. Practical experiment (Demonstration plot)
Nov. - Dec. 2 - 3 days for each	Before harvesting, to give the instruction and guidance about marketing system and quality control	A. B.	1. Harvesting method 2. Processing and quality control 3. Marketing system 4. Evaluation

NOTE: A.P.C. : Agricultural Primary Cooperative.

(4) Marketing

In East Java farmers are bended by the "idjon" system (credit before planting/harvest) to the brokers such as tengkulak. So the farmers cannot increase their income even if they can increase production of maize. To release farmers from idjon system, it is essential to promote agricultural cooperative organizations.

To reduce marketing cost, and to modernize marketing channel, it is essential to introduce the rule of competition in the marketing field. In East Java, almost all marketing channels are occupied by brokers. To let brokers and agricultural cooperatives compete, with one another, it is necessary to promote agricultural cooperative organizations. Because the

cooperative organizations are too weak to compete with the brokers in the marketing field of maize.

So far, for four years we have helped GAKOPERTA to develop as exporter of the Project's maize through credit system. It is very important to foster the Primary Agricultural Cooperatives because of the following reasons:

- (a) GAKOPERTA is comparatively bigger than Puskoperta and Primekoperta, which are very small and poor, in East Java. But Gakoperta is supported by Puskoperta which in turn is supported by Primekoperta. So, Gakoperta and Puskoperta will not be able to develop more, if Primekoperta cannot develop.
- (b) Even if Gakoperta could develop so far, we cannot increase the income of the farmers; it is essential to develop the Primekoperta.

We selected the Model Primary Cooperatives among the Project areas. Fundamental conditions to select the model primary cooperatives are as follows:

- (a) The cooperative has to cover more than 300 ha of the Project area, or to cover more than 100 ha but have a possibility to enlarge more than 300 ha in the near future.
- (b) The cooperatives can easily get good leader as the head of the cooperative.
- (c) The cooperative must be active and have better conditions of repayment.

Among these Model Cooperatives we'd like to select leading Model Cooperatives. We want to develop leading Model Cooperatives as soon as possible and expect them to give stimulative influence to other Model Cooperatives.

The leading Model Cooperatives are as follows:

Region / Kabupaten	Name of Cooperatives
1. Kediri	Kepung and Bulupasar
2. Malang	Dengkol
3. Banjuwangi	Wongsoredjo

To fulfil these purposes, we should arrange equipments, facilities and tools for the management of leading Model Cooperatives and also arrange processing machinery such as corn sheller, dryer, winnower, trucks, tractors pull trolleys and wheel barrows.

It is necessary to give the following guidance to them.

- (a) Taking measures to increase yield by concentrative guidance and increased portions of production should be invested to the cooperative for their original capital accumulation.
- (b) Guidance of operation, planning and management of the cooperatives.
- (c) Training of how to use machinery effectively.
- (d) Sending the leaders of cooperatives and key-farmers to Japan for training.
- (e) Guiding the cooperative to continue all year round business in handling not only maize but also other crops.

(5) Processing

(a) Shelling and selection (Processing)

According to our survey, it is more economical to use shelling machine than by hand. It is about one second to use corn sheller by gasoline engine as compared with hand shelling. As it will be done by diesel engine, the shelling cost will be much less than by gasoline engine.

Regarding shelling, it is more useful and economical to shell by rotary type corn sheller than other ways. Even if it is now, in the present conditions, it is not enough to select and clean kernels. Using winnower is better to clean kernels. Winnower can select small and immature grain to some extent.

It is very effective to collect and dry in ear corn form until 18% of moisture content and shell it after re-drying until 14.5% of M.C. So we'd like to suggest to extend this drying method to the Project area.

(b) Warehouse and drying floor

According to our survey, processor cannot dry their fresh ear corn without enough drying floor. After harvest, fresh ear corn is obliged to be kept at the eaves or on the ground outside. If fresh ear corn is kept in such a condition for more than 3 days, it will be spoiled and also mold growth can be seen. So, it is necessary to prepare warehouses and drying floors at each Primary Koperta levels. The size of the warehouse and the drying floors are as follows.

- a. Warehouse 150 m<sup>2</sup> Tile roof Concrete floor Brick
- b. Drying floor 350 m<sup>2</sup> or wooden plate wall.



### III. MAIN ACHIEVEMENTS

#### 1. The Increase of Yield per Ha

In East Java there are averagely one million hectare of maize planted area every year. It's cultivated acreage is about six hundred thousand ha. The yield of maize in East Java is averagely 0.7 ton per ha.

In the Project area the yield of maize was averagely 1 ton per ha before the Project. In using urea of 200 Kg per ha and superior seed of 25 Kg per ha, the yield in the Project area has increased from 1 ton to 2.7 tons per ha. Comparing with the yield of 1 ton per ha without fertilizer and with local variety, we may say that the yield of 2.7 ton per ha is an epoch-making effect of production increase. From this fact the Government as well as the farmers has come to have a confidence of production increase. In addition to it, the farmers have learned how to use fertilizer from the guidance of the experts. Some farmers have begun to buy and use fertilizer by themselves. Most farmers who have realized the effect of fertilizer want to use it very much to increase the yield. Table I and Table II show the transition of the yield.

TABLE I : The Transition of Average Yield of Maize (Unit: ton/ha)

PROJECT AREA	Average yield of the Project					Mean
	5 years average	1968/1969	1969/1970	1970/1971	1971/1972	
Kediri	1,000	2,950	2,690	2,880	1,990	2,628
Malang	1,000	2,800	2,670	2,710	2,890	2,768
Kuning	300	2,810	-	2,900	2,700	2,803
Bondowoso	1,000	-	-	2,800	4,360	3,580
Banjuwangi	1,000	2,620	2,600	2,720	-	2,643
Arithmetic mean	0,960	2,793	2,653	2,802	2,985	2,808

TABLE II. Harvested area of the Project (Unit: ha)

	1967/1968	1968/1969	1969/1970	1970/1971	1971/1972
Kediri	20,306	200	1,688	1,829	3,198
Malang	100,674	48	350	1,183	973
Kuning	77,711	100	-	100	312
Bondowoso	52,753	-	-	325	184
Banjuwangi	34,103	218	1,815	1,799	1,055
Total	265,699	566	3,853	5,136	5,722

Weighted means of yield made by I and II,

	1967/1968	1968/1969	1969/1970	1970/1971	1971/1972	
Weighted arithmetic mean	0.9456	2.781	2.646	2.782	2.540	2.662

2. Bimas Djagung and Bimas Palawidja  
(Mass Guidance for Maize and Mass Guidance for Second Crop)

Stimulated by the result of the Project, the Government of East Java Province started the BIMAS DJAGUNG to promote the exportation of maize in the year 1971/1972. According to the program the target of the Bimas Djagung was to plant 100,000 ha of maize. But it was turned out to be about 20,000 ha. In the year 1972/1973, the Central Government has a plan to develop the Bimas Palawidja which has a target to plant 54,000 ha of maize in Indonesia. Now the Government are going to enlarge the planted area to extend the effect of the Project into the whole country as well as larger areas of East Java. That is to say, the purpose of Bimas is to extend the fruit of the Project into larger area. We must say that Bimas Djagung and Palawidja show that the Project has played a role as a Pilot Project.

3. It is characteristics of the Project that around 500 Kg kernels per ha of harvested maize are reserved as repayment portion to the credit by local agricultural cooperative organizations, such as Prine Koperta and Pus Koperta. Reserved maize are dried, processed into a better quality and then transported by them to the GAKOPERTA (The Provincial Federation of Agricultural Cooperative Associations). The Gakoperta does fumigation and grading to export maize to Japan's counterpart ZENNON (The national Federation of Agricultural Cooperative Associations) at a higher price than that of the world market. These activities of the agricultural cooperative associations such as drying, processing and exporting has been contributed not only to promote the development of cooperative organizations but also increasing the income of farmers. For four years several cooperatives were established to continue to develop in the Project area. After two years, some of them will surely come to become self-supporting. On the other hand, the Gakoperta, which has no experience of exporting maize before the Project, has exported so far, about 3,500 tons of maize to Japan. The amount of export is ever increasing year by year.

The exported amount of Gakoperta for four years are as follows:

EXPORT AMOUNT

Year	Amount Kg	Price	Seller	Exporter	Importer	Buyer
68/69	260,000	Sbj.FOB \$49MT	Maize Project	GAKOPERTA	UHCOP	ZENKOREN
69/70	500,000	Sbj.FOB \$54MT	East Java	- " -	JAPNA	- " -
69/70	601,060	Bnj.FOB \$50MT	- " -	- " -	- " -	- " -
70/71	900,600	Sbj.FOB \$66MT	- " -	- " -	- " -	- " -
70/71	350,000	Sbj.FOB \$61MT	- " -	- " -	- " -	- " -
71/72	600,000	Sbj.FOB \$51.50MT	- " -	- " -	- " -	- " -
71/72	225,000	- " -	- " -	- " -	- " -	- " -
71/72	400,000	Scheduled	- " -	- " -	- " -	- " -
71/72	250,000	- " -	- " -	- " -	- " -	- " -
Total	4,086,660	-	-	-	-	-

ZENKOREN merged with ZEMHAREN into ZENVOH

4. As mentioned above, it is the point in the Maize Project East Java that consistent technical guidance is given all the way from production to exportation. Through this guidance a few counterparts among the Indonesian counterparts were trained to become experts in charge of fumigation and grading. We are now proud that these Indonesian experts do fumigation and grading in exporting maize from the Project.
5. List of suggestion/report submitted from the Japanese expert team
  - 1) Implementation of Maize Project East Java in the first year (1968-1969)
    - a. The selection of the areas.
    - b. Policy of the Project.
    - c. Results.
    - d. Problems to be solved.
  - 2) The relation between : The production of Maize and Precipitation in East Java (Dec. 1969)
  - 3) How to accelerate maize exportation (1969)
  - 4) Progress report of the maize Project East Java (January 19th, 1971)
    - a. Seed preparation.

- b. Size of the areas.
- c. Contract for production.
- d. The contract for processing, storage, transportation and exportation.
- e. Cost; non-regular staff processing machinery and equipment.
- f. The progress.

5) The suggestion on experiment in Dry Season (May 18th 1971)

6) Standardization of Maize and other agricultural commodity of export (July 13th 1971)

- 7) Suggestion.
  - a. To build warehouse together with the drying floor in the desa level.
  - b. To equip and facilitate processing machinery.
  - c. To employ the tentative staff as the extension workers.
  - d. Credit to the Agricultural Cooperative Association to purchase the maize from the farmers.

- T. SHIMIZU**
- 1) Some opinions for improving agricultural cooperative in East Java (April 23th 1970)
  - 2) Trial analysis for maize production cost.
  - 3) Suggestion for maize project from marketing expert. (September 15th 1970)

- S. YAMAZAKI**
- 1) Reports and guide to the maize culture in East Java on the basis of the data obtained during last two years. (Nov. 1968-Oct. 1970)
  - 2) Technical consideration and suggestion as to improve the maize culture in East Java. (Apr. 1970)
  - 3) Fertilizer test
  - 4) Maize survey in the village of Nggarahan (Bondowoso 1970)
  - 5) Brief report of dryer course and experiment in Bedali March 3rd-20th of 1970.

- T. FUKUZATO**
- 1) The consideration on the additional fertilizing period.
  - 2) Program for Extension guidance

- 3) The suggestion on seed multiplication for 1972/1973 Wet Season (Nov. 15th 1971)
- 4) Connection between soil preparation and germination. (Feb. 9th 1972) Keasaman tanah tegal Bondowoso.
- 5) Suggestion experimental planting of sorghums. (March 9th 1972)
- 6) Suggestion to increase the national income in exporting surplus. (April 11th 1972)

Dr. S. HIROSE 1) Report of Experiment in Maize Project East Java 1971. (January 10th 1972)

- 2) Cultivation techniques for maize production.

E. KOCHI Recommendation

- Y. YOSHIKUNI 1) Suggestion for processing Godown & Desa Godown. (January 22nd 1972)
- 2) Remarkable points of our Maize Project East Java.
  - 3) Suggestion about the distribution of equipments.
  - 4) Report about equipments (March 7th 1972)

THE INDONESIA - JAPAN AGRICULTURAL DEVELOPMENT PROGRAMS

I. OUTLINE OF THE PROJECT

1. Name Indonesia - Japan Agricultural Development Programs

2. Location Tjihea Tani Makmur: Tjihea in Kab. Tjiandjur  
Extension Farm: Muara in Kab. Bogor  
Training: Muara in Kab. Bogor and  
Pasarminggu in Djakarta

3. Date of the Agreement

The Record of Discussion was first signed on the 28th of May 1968 for the period of three years (May 1968-May 1971) and it was renewed on the 21st of June 1971 for the period of another three years (May 1971-May 1974). ) ?

4. Aims

This project consists of the three sub-projects as follows.

(1) The Tjihea Tani Makmur Project

The Project, covering the area of 1,006 hectares composed of 250 hectares of the State Farm and 836 hectares of private farms in Tjihea district, will be implemented for the purpose of increasing farmers' income and raising their standard of living.

- (a) Improvement of agricultural infrastructure
- (b) Improvement of farming techniques
- (c) Technical advice concerning high yielding seed
- (d) Development of farmers' organizations
- (e) Regional training for extension workers in West Java

(2) The Extension Farm Project

The Project will be implemented for the purpose of agricultural modernization in such Kabupaten as Bogor, Sukabumi, Tjiandjur, Karawang, Subang, Bekasi and Tangerang in West Java.

- (a) Extension centers
- (b) Demonstration farms
- (c) Regional training

(3) The Training Program Project

The project will be implemented to develop technical ability of the officials concerned of the Central Government as well as the Provincial Governments.

(a) Training on seed production

(b) Training on agricultural machinery

5. Experts

<u>Name</u>	<u>In Charge</u>	<u>Term of Duty</u>
K. Sugo	Team Leader	Sep.1968-May.1974 (in Bogor)
M. Funada	Demo-Farm	Sep.1968-May.1974 (Tjihea Tani Makmur Project)
M. Haga	Farm Machinery	Sep.1968-May.1974 (ditto)
H. Tokunaga	Experiment	Sep.1971-May.1974 (ditto)
M. Wakabayashi	Land Consolidation	Sep.1971-May.1974 (ditto)
K. Akagawa	Demo-Farm	Sep.1971-May.1974 (Extension Farm Project)
T. Shinozawa	Demo-Farm	Sep.1971-May.1974 (ditto)
Imanishi	Farm Management	Jun.1972-May.1974 (Tjihea Tani Makmur Project)

6. Counter-Parts

<u>Name</u>	<u>In Charge</u>	
Sukri	Demo-Farm	Tjihea Tani Makmur Project
Tjetjo	Demo-Farm	Tjihea Tani Makmur Project
Arin	Demo-Farm	Tjihea Tani Makmur Project
Wazlir	Farm Machinery	Tjihea Tani Makmur Project
Momo	Experiment	Tjihea Tani Makmur Project
Toto	Land Consolidation	Tjihea Tani Makmur Project
Budy	Land Consolidation	Tjihea Tani Makmur Project
Sukersono	Land Consolidation	Tjihea Tani Makmur Project
Djunaedi	Demo-Farm	Extension Farm Project
Suroso	Demo-Farm	Extension Farm Project
Manir	Farm Management	Tjihea Tani Makmur Project

Besides the above counterparts cooperating with the experts in field activities there are the staffs who are engaged mostly in administration.

The Tjihean Tani Makmur Project and Extension Farm Project

<u>Name</u>	<u>In Charge</u>	
Arifin	Project Manager	Department of Extension
Sumadi	Planning	ditto
Sumitro	Administration	ditto
Tonton	Operation	ditto
Sabur	Operation	West Java Provincial Government
Didi	Assistant	ditto
Askas	Assistant	ditto

The Training Program Project

Soepriman	Soed Training	Central Research Institute for Agriculture
Sugianto	Farm Machinery Training	Department Technique
Ruhijat	Assistant	ditto
Elon	Assistant	ditto



7. Equipments and Machineries Provided by the Government of Japan  
(O.T.C.A.)

(1) Items

- (a) Power and hand farm machineries such as tractors, sprayers, rice mill, selector, dryers, pumps and harvesters
- (b) Seed inspection implements like moisture testers, separators, and refrigerator
- (c) Implements necessary for seed and machinery inspection
- (d) Implements and equipments for extension service such as microphones, cameras projectors and films
- (e) Machineries for land consolidation
- (f) Fertilizers and agro-chemicals
- (g) Office equipments of typewriters, copiers, calculators, steel cabinets and rockers
- (h) Vehicles of jeeps, trucks, station wagons, wagon-jeeps, a mini-bus and auto cycles
- (i) Machine tools such as grinder, drill, lathe and welders
- (j) Measurement and inspection implements

(2) Sum

1968	1969	1970	1971	1972	Total (¥1,000)
91,246	12,159	12,746	30,000	33,000	179,151

Note: a. Besides the one above mentioned the equipments and implements worthy of US\$250,000 were supplied under the Kennedy Round Food Aid to raise the model agricultural cooperative associations in Tjihea.

b. For the fiscal year of 1973-1974 an estimate of ¥10,000,000-15,000,000 plans to be appropriated for the possibly necessary spare parts in 3-5 years to come, printing of various text-books and the additional equipments.

- c. The sum of 1971 includes the cooperation funds from both Japan Ammonium Sulphate Industry Association and Japan Agro-Chemicals Export Promotion Association.

## II. ACTIVITIES OF THE PROJECT

### 1. Tjihea Tani Makmur

#### (1) Demo-Farm

Demo-Farms (5ha each) were set up in 16 locations with the object of giving the farmers guidance concerning economical techniques on production increase and small productive organization (Kelompok). Results were max. 8.5t/ha, min. 5.3t/ha and 6.8t/ha on an average, all which was over our expectation. With regard to this demo-farm, it is so designed that 16 new demo-farms are additionally set up in every season and "after cares" are provided to the old demo-farms. Rp.12,555/ha has been provided in a form of credit from the province owned farm for fertilizers, seeds and agro-chemicals.

#### (2) Field Test

Upon consultation with Central Research Institute for Agriculture tests have been conducted for the purpose of establishing the cultivation standard in Tjihea district. Main results gained in last wet season are as follows.

- (a) In case of deep transplanting (7cm), rooting, tillering and especially initial growth delayed, and 1,000 grains weight was 5-15% lighter when compared with shallow transplanting. The degree of effectiveness of shallow transplanting was found greater in the order of Pelita-I PB-5 Syntha.
- (b) In comparing 18-day and 23-day old seedlings, Pelita showed and increase in yield at 10-18% in former case though PB-5 and Syntha did not indicate any of clear difference in yield.
- (c) According to the comparison of top-dressing methods, i.e. preponderant fertilization in first half stage (first 70%, second 30%) and that in second half stage (first 40%, second 60%), the latter proved to be

greater in 1,000 grains weight and yield.  
Three times top-dressing method has been followed in  
Tjihea on the basis of the fertilizer test in which  
yield had proved to be greater.

### (3) Farm Mechanization

Training was provided on farm machinery for 32 in all,  
2 from each Demo-farm where tractors are to be introduced.  
Machineries other than tractors such as sprayers and  
threshers are lent out upon request together with guidances  
on them.

Guidance is now given on the repairing works as well since  
repairing tools and implements have been improved and  
mechanics added.

Furthermore guidance has been provided on the operation  
of the rice mill (Capacity:1T) which had been installed  
on Feb. as one of the steps to promote a agricultural  
cooperative association.

Contract processing being conducted as well for the  
farmers gets great popularity among them as recovery amounts  
to 66-68%, 4-5% higher than that of neighboring rice mills  
and fee is lower at about 12%.

It is out hope that the rational methods could be found  
out for the operation of rice mill through these facilities.

### (4) Land Consolidation

Land consolidation covering 100ha is under way with a view  
to giving hope to the farmers as well as to providing  
technical guidance on it.

Almost all the modernized farm machineries will become  
possible to be casted in after completed.

The plots for test, observation, training and seed are  
to be set in there, all which is expected to constitute  
a pilot farm as whole for the further promotion of  
Tani Makmur project.

### (5) Farm Household Economic Investigation

It is sheduled to conduct farm household economic  
investigation annually and to examine the origin of  
income increase on the basis of the results of the  
investigation, in order to serve for increasing farmer's  
income. At present an expert on farm household economic  
investigation from Tropical Agriculture Research Center  
in Japan has been cooperating for the investigation, which  
will be taken over soon by the expert from O.T.C.A.  
Mr. Imanishi.

(6) Rearing of agricultural cooperative association and productive organization

Rationalization of circulation through rearing of agricultural cooperative association is very important for increasing farmer's income, as well as giving guidance concerning techniques on production increase. If rearing of models of agricultural cooperative association and productive organization in Tjihea will result in success, this experience is considered to be of great service for rearing agricultural cooperative association in Indonesia.

Rice milling machine, trucks (7), fertilizers, agricultural chemicals and farm machinery were introduced first of all under Kennedy Round Food Aid, in order to get personnel expense, working capital and revolving fund of agricultural cooperative association.

Province farm has been like the proxy for agricultural cooperative association at present, however some activities of province farm is scheduled to be transferred to agricultural cooperative association in future successively.

(7) Training

Training has been given to the farmers in Tjihea and the extension workers of 7 Kab. in West Java on paddy cultivation and farm machinery.

In future the subjects of farm management and irrigation are to be added in this training.

As the training implements and machineries are enough prepared it will be possible to conduct more efficient and pleasant trainings if only class-rooms, dormitory for trainees and laboratory are ready.

(8) Forecast of Diseases and Injurious Insects

It is planned to introduce the implements for forecast of diseases and injurious insects in Tjihea and the extension centers in 7 Kabupaten so as to direct timely prevention through examining occurrence of diseases and injurious insects.

(9) Seed Inspection

Seed production has been conducted for the purpose of distributing excellent seeds to Tjihea district and its surrounding farmers, together with technical guidance on seed production and inspection.

## 2. Extension Project in 7 Kabupatens

In this project with a view to searching the efficient extension method, the total of 21 demo-farms (3ha each) were set up in 7 of 20 Kabupatens of West Java, 3 demo-farms in each Kabupaten and guidance concerning the techniques on production increase was conducted.

The enthusiasm was different in the agricultural extension offices and extension workers on account of their poor experiences, which eventually resulted in great differences in the yields gained, 8.2t/ha at max. and 3.6t/ha min. as fresh unhulled rice.

It is scheduled to set up 2 extension centers in each Kabupaten totalling 14 centers, among which 5 centers have been completed, with the intension of training local extension workers and farmers.

The various kinds of implements required for this training have been already prepared. It is expected that experienced farmers would cooperate in the extension works through transmitting the story of their experiences to surrounding farmers after the successful completion of this project.

In other works the experienced farmers are expected to turn to be a "nucleus" of extension works. It means this project gives indirect aid to Bimas program that they will come to borrow the credit of Bimas spontaneously.

As the field guidance is not yet active in Indonesia, it seems effective for production increase to give the field training at extension center (extension farm) for the local extension workers and key farmers who directly come in contact with farmers. It is expected that demo-farm considered as a kind of productive organization (Kelompok) will grow to be pipe between agricultural cooperative association and farmers in future, through practising joint nursing of seedling bed, plant protection and water management, etc. upon making the most of a laudable custom of "Gotong Rojong."

### 3. Central Training

Cooperation has been extended in form of training from 1968 in the fields of rice production, seed inspection and farm mechanization.

As for the training on rice production the total was brought up to 722 who have completed this training course in 13 times, 106 from 3-month-course in 3 times, 116 from 1-month-course in 4 times and 500 from 1 to 2-week-course in 6 times. For seed inspection trainees amounted to 200 who have undergone 1-month-course in 8 times.

In total 79 were provided with 4 to 8-month-training course on farm mechanization. Besides this central training, training on farm mechanization were conducted several times upon request in other provinces than West Java.

### 4. List of reports presented to Indonesia

To Mr. Sakikin, Director General of Agriculture

June 1970; Some opinions on seed inspection and production and on use of farm machinery

June 1970; Design of Tjihea Tani Makmur Pilot Project

December 1970; Progress of cooperative project and some opinions on the method of conducting the project from now

To Mr. Salmon, Director of Agricultural Extension

December 1970; Explanation concerning demonstration field

January 1971; Rice cultivation techniques (Text book)

October 1971; Technical cooperation on agriculture of West Java (General design of the project)

November 1971; Some opinions for making progress of the extension project

November 1971; Summary of rice cultivation techniques for demo-farm

November 1971; My suggestion and opinion (Opinion on conducting project)

- March 1972; Suggestion on technical guidance
- March 1972; The duty of counterparts
- March 1972; Opinions on introducing machinery and implements
- April 1972; The plan of observation field in Extension Center
- May 1972; The Opinions on fertilization and plant protection
- May 1972; The opinions on Province Farm in Tjihea
- June 1972; Some opinions on countermeasures for rising farmer's income
- June 1972; Some opinions regarding overproduction of rice
- To Mr. Dahro, Director of Central Research Institute for Agriculture
- January 1972; Rice cultivation techniques  
(Seminar text book)
- May 1972; Regarding the tests to make cultivation standard

THE INDONESIA-JAPAN JOINT CROP RESEARCH PROGRAM

I. OUTLINE OF THE PROGRAM

1. Name           The Indonesia-Japan Joint Food Crop Research Program
2. Location       c/o Central Research Institute for Agriculture  
Djl. Merdeka, Bogor, West Java
3. Date of the Agreement  
Oct. 23, 1970
4. Aims  
This program has for its object to carry out the joint research on plant protection of food crops in the field of plant pathology, verus vector and physiological disorders.

5. Experts

<u>Name</u>	<u>Research Field</u>	<u>Term of Duty</u>
Y. Iwata	Plant Pathology	March 1971-February 1974
T. Nishizawa	Plant Pathology	March 1971-February 1973
F. Yazawa	Plant Physiology	March 1971-February 1973
H. Satomi	Plant Virology	May 1971-May 1973

6. Counter-Parts

<u>Name</u>	<u>Research Field</u>
Dahro	Research Administration
I.N. Oka	Plant Pathology
I.D.M. Tantera	Plant Virology
Mukelar A.	Plant Pathology
Machmud	Plant Pathology
Rocchan	Plant Virology
Sudjadi	Plant Pathology
Nunung H.A.	Plant Pathology
Hartini R.E.	Plant Pathology
S. Paransih I.	Plant Physiology
M. Ismunadji	Plant Physiology



Iskandar Zulkarnaini	Plant Physiology
Lukman Nel Hakim	Chemical Analysis
Sismiati	Plant Physiology
Ratna Hasan	Plant Physiology
Fatchurochim	Plant Physiology
Siti Insijah	Chemical Analysis

7. Equipments and Machinerics Provided by the Government of Japan

(1) Items

(a) Plant Pathology and Virology

(1970-1971)

Thermostatic hot air sterilizer	2	Insect specimen cabinet	2
Shaker	1	Spore trap	1
Wide range incubator	3	Copyer	1
Autoclave	3	Electronic computer	1
Arnold sterilizer	1	Hand computer	2
Portable high speed centrifuge	1	Typewriter	2
Centrifuge	1	Transformer	8
Glass electrode PH meter	1	Compressor	1
Vacuum pump	1	Air conditioner	4
Freezer	2	Jeep	1
Deep Freezer	2	Direct reading balance	1
Refrigerator	1	Thermostatic water bath	1
Camera	2	Seed bed warmer set	2
Microscope	4	Stereoscopic microscope	2
Microphotographic unit	1	Photographic stand	1
Slide duplicator	1	Sliding microtome	1
Rotary microtome	1	Diesel generator	1
Insect light trap	2		

(1971-1972)

Green house	4
Jeep	1
Soil sterilizer	1

(b) Plant Physiology

(1970-1971)

Constant temperature oven	1	Demineralizer	1
Pulverizer	1	Electric water bath	1
Ball mill	1	Electronic computer	1
Shaker	1	Handling computer	1
Homogenizer	1	Type writer	1
Rotary vacuum evaporator	1	Muffle furnace	1
Direct analytical balance	1	Auto still for distilled water	1
PH meter	2	Jeep	1
Thin layer chromatography apparatus	1	Air Cleaner for microelement laboratory	1
Nitrogen semimicro-determination apparatus	1	Leaf area meter	1
Carbohydrate determination apparatus	1	D.O. meter	1
		Camera	1
Refrigerator	2	Enlarger	1
Deep freezer	1	Flame photometer	1
Spectrophotometer	1	Transformer	6
		Diesel generator	1

(1971-1972)

Low constant temperature water bath	1	Auto balance type temperature recorder	1
Draft chamber	1	Auto solar radiation recorder	1
Universal projector	1	Constant temperature oven	1
Microscope	1	Cation exchangeable capacity measuring apparatus	1
Photo system for microscope	1	Atomic absorption photometer	1
Water test set	1	Double beam grating spectro-photometer	1
Microtome	1		
Fat collecting set	1		
Top pan direct reading balance	1		

(2) Sum

	Plant Pathology & Virology	Plant Physiology	Shipping freight, Insurance	Total
1970-1971	17,281,450	13,260,210	2,650,793	33,192,453
1971-1972	15,060,434	12,798,434	3,089,724	30,948,407
1972-1973	17,705,000	10,705,000	3,702,000	32,183,000

## II. RESEARCH ACTIVITIES

This research cooperation team arrived at Bogor on March 1971, and received the equipments and consumables based on the budget for 1970-1971 on June 1972.

However, at that time basic conditions of laboratory, such as electricities, water supplies, gas etc. were not satisfactory, to operate the equipments and machines for laboratory works. The team members have made every effort to improve the laboratory conditions. At the same time, we have carried out the experiments in laboratory and green-house as far as we can under such conditions. Survey and tests in the field were also tried according to the research scheduel.

Construction of four green-houses for the researches in plant pathology and virology was completed in the middle of April 1972, and other equipments and consumables based on the budget for 1971-1972 arrived on May 1972.

Although the arrangement of laboratory should be continued, condition for research works is being improve step by step in cooperation with Indonesian research administrators and researchers concerned.

### 1. Plant pathological and Virological Research:

Preliminary experiments in the laboratory and the green-house were carried out in 1971. In the rainy season 1971-1972, in addition to these experiments, field tests were planned and conducted in the Muara experimental station. These test include the screening of resistant varieties and chemicals for the control of bacterial leaf blight and sheath blight of rice. Ecology of insect vectors of virus diseases and resistance of several rice varieties to virus diseases have also been investigated.

#### (1) Survey on the distribution of food crop diseases:

To study the present conditions of the occurrence and distribution of food crop diseases in Indonesia, surveys have been done on several localities in Djawa, South Sulawesi and South Kalimantan. The following diseases have been observed during these surveys.

Rice: Yellow dwarf, Gassy stunt, Bacterial leaf blight, Bacterial leaf streak, Blast, Sheath blight, Stem rot (*Leptosphaeria salvinii*), Helminthosporium leaf spot, False smut, Cercosporaleaf spot.

Corn: Downy mildew, Rust, Leaf spot, Sheath blight.

Pulses: Peanuts- Witches' broom, Sclerotial blight, Leaf spot, Bacterial wilt.

Soy bean- Virus diseases, Sclerotial blight, Katjang hidjau-Virus diseases, Witches' broom, Sclerotial blight, Damping-off.

Sweet potato: Witches' broom, Leaf spot

These surveys should be continued.

(2) Studies on bacterial leaf blight of rice

(a) Screening test of resistant varieties

In the dry season 1971, preliminary tests were carried out on 10 varieties by inoculating the bacteria on seedlings and rice plants at maximum number of tillers stage. As a result, no resistant varieties were found in these tests.

In the rainy season 1971-72, screening tests were done on 35 varieties in green house, and 266 varieties and lines in the Muara experimental station. Examination and arrangement of the experimental data are in progress.

(b) Screening test of the chemicals for the control

Several chemicals were found to be effective for the control of bacterial leaf blight in the tests on seedling inoculated with causal bacteria. These chemicals were applied to field tests in the Muara experimental station, and the results are now being arranged.

(c) Forecast by phage method

Forecast of bacterial leaf blight by use of bacteriophage

of causal bacteria, *Xanthomonas oryzae*, "phage method" is practiced in Japan.

Bacteriophage has been successfully detected in the irrigation water and the surface water on paddy field in the Muara experimental station.

Investigation on the relationship between the bacteriophage in the surface water of paddy field and the disease occurrence are now under way to explore the possibility of forecast of bacterial leaf blight by phage method in Indonesia.

(3) Studies on sheath blight

(a) Screening test of resistant varieties

Screening test of resistant varieties by inoculating the pathogen (*Pellicularia sasakii*) has been carried out in green-house (35 varieties) and in the experimental station at Muara (266 varieties and lines). The results are now being arranged.

(b) Screening test of chemicals for the control

The results of preliminary screening test showed that some chemicals are effective for the control of sheath blight. These chemicals were then applied to pot test, and to field tests at Muara. As the result, Valida, Polyoxine Z and Necozezin were proved to be effective for the control of sheath blight.

(4) Studies on rice blast

Screening test of resistant varieties to rice blast (*Piricularia oryzae*) have been carried out in the fields at Sukabumi where rice blast occurs endemically. Investigation on physiologic races, test on varietal resistance and also basic study for chemical control are now under consideration.

(5) Studies on bacterial leaf streak

Causal bacteria (*Xanthomonas translucens* var. *oryzicola*) have been isolated from the diseased leaves collected from

various places and investigated in physiological characters. Screening test of resistant varieties has been done on the seedlings by inoculating the bacteria, and also on rice plants in the naturally infected fields of the Muara experimental station.

(6) Studies on virus diseases

(a) Identification of virus disease

Through the transmission experiments by insect vectors, Nephotettix nigropictus and Milaparvata lugens, presence of yellow dwarf and grassy stunt in Indonesia has been proved respectively.

(b) Investigation on the ecology of insect vectors and varietal resistance of rice in the field.

Investigation on the occurrence of insect vectors (leaf hopper and plant hopper) related to virus diseases, and also on the resistance of several varieties to virus diseases has been carried out in the Muara experimental station. Insect light traps have been set in Muara and Tjiandjur for the investigation on the occurrence of insect vectors.

(7) Studies on the major diseases of corn

Inoculation methods for testing varietal resistance of corn to downy mildew have been studied and also epidemiology of downy mildew in the fields in CRIA has been investigated. Survey on the occurrence of major diseases of corn in Indonesia and screening test of resistant varieties in 1972-1973 were planned.

References:

(a) Progress report of Indonesia-Japan Joint Food Crop

Research Program No. 1 Studies on bacterial leaf blight of rice (1). July 1, 1971

(b) Ditto No. 2 Studies on virus diseases of rice (1)  
Identification of virus diseases - April 1, 1972

## 2. Plant Physiological Research

To study the general aspects of physiological disorders of food crops in Indonesia, surveys have been done on various localities. In the dry season 1971, some pot and field tests were done to confirm the cause of "Mentek" disease observed in the experimental farm in Tjihea. In the rainy season 1971-72, field tests in the experimental stations at Muara, Tjihea and Ngale, and experimental farm at Jogjakarta, and also four kinds of pot tests at CRIA in Bogor were carried out to examine the cause of physiological disorders and to explore the counter-measures.

### (1) Survey on the physiological disorders of food crop

Surveys on various localities in Jawa, South Sulawesi and Soth Kalimantan have revealed the disorders of rice apparently caused by phosphorus deficiency, iron toxicity or toxic gas originated from strong reduction of soil. Physiological disorders caused by magnesium deficiency were observed on corn and peanuts in South Sulawesi. Soil and plant samples from these disordered fields are being analyzed chemically. These surveys should be continued.

### (2) Studies on the relation between yield and nitrogen requirement of rice on physiological disordered fields

Several tests have been made on the relation between yield and nutrient in rice plant, and nitrogen requirement of rice grown on various kinds of soil.

- (a) In the dry season 1971, in pot tests using Ngale soil (grumusol), application of physiological acid fertilizer revealed the effectiveness for yield increase, suggesting that the soil is not deficient in sulfur.
- (b) In the dry season 1971, in the field test at Tjihea, remarkable decrease in rice yield on "Mentek" field and apparent disorders by iron toxicity were observed.
- (c) In the dry season 1971, tests on nitrogen requirement of rice were carried out on the farms treated with different nitrogen level, in the experimental stations of Muara, Pusakanegara, Ngale, Genteng, and Modjosari. The results showed that according to different type of soils of the stations, nitrogen requirement to produce

100kg grain varied between 1.27-2.20kg, and this value increasing nitrogen application. Nitrogen utilization ratio fertilizer used, was also variable, and it was low in Muara soil. Increase of this value for better rice production in Muara will be possible by improvement of cultural practices.

- (d) In the rainy season 1971-72, investigations on leaf area index, and dry matter production, and starch tests were carried out on four rice varieties with different growth type in the Muara experimental station. Samples are now under chemical analysis.

- (3) Studies on growth and root activity of rice grown on different type of soils

In the dry season 1971, pot tests were conducted, using the soils of experimental stations in Muara, Ngale, Pusakanegara and Singamerta.

The results indicated that rice plants on Ngale soil showed extreme phosphorus deficiency, and rice growth in Muara soil was inferior at vegetative stage, but recovered at later stage of growth. Chemical analysis is being carried out.

Root development of rice was studied in glass pots, using five different type of soils (Muara, Ngale, Patjet, Pusakanegara and Singamerta). Root rot was observed in Patjet soil.

Symptom of white and slender roots, restricted in distribution, was observed in Ngale soil at early stage of growth.

Arrangement of experimental data is now under way.

In the rainy season 1971-72, 12 rice varieties were grown in nutrient solution in pots and their root activities were measured by alpha-naphthylamine method which is based on the oxidizing activity of roots. The results showed that there are differences in dry weight and activity of root system among the rice varieties.

- (4) Studies on resistance of rice varieties to high nitrogen application and to soil reduction.

31 rice varieties in the dry season 1971 and 18 varieties in rainy season 1971-72 have been subjected to pot tests. The results are now being arranged.



(5) Studies on the countermeasures on fields of "Akiochi" and "Mentek"

In the rainy season 1971-1972, it was shown from the tests on "Akiochi" farm in Jogjakarta that the application of ball fertilizer is effective to increase rice yield, showing the necessity of nutrient supply at later stage of growth. On the experimental farm in Tjihea where severe "Mentek" disease was observed, application of potassium fertilizer was effective to prevent "Mentek".

(6) Studies on physiological disorders of soy bean

Field tests are planned in the Muara experimental station in the rainy season 1972-1973.

References:

- (a) Nitrogen requirement of lowland rice on major Jaxa soils presented at the staff meeting in Cria. May 29-30, 1972
- (b) Preliminary experiment on the study of root activity of 12 rice varieties ditto

3. Training of the Counterpart in Japan

Based on the agreement between the Government of Republic of Indonesia and Japan, Mr. Lukman (CRIIA) is now staying in the National Institute of Agricultural Sciences in Tokyo for 6 months from January 1972 to study the modern methods of chemical analysis. In 1972-73, four scientists are expected to visit Japan for training in the Research Institutes in Japan.

THE TADJUM PILOT SCHEME

I. OUTLINE OF THE PROJECT

1. Name            The Tadjum Pilot Scheme
2. Location        Tinggarjaja, Kotjamatan Djatilawang, Kabupaten  
Banjumas, Djawa Tengah, Indonesia
3. Date of the Agreement    Feb. 16, 1971
4. Aims
  - (1) Design and construction of farm roads, irrigation and drainage facilities in the area.
  - (2) Technical advice to the farmers in the area and officials concerned on effective water management.
  - (3) Improvement of agricultural techniques and extension of advanced multi-cropping cultivation techniques on food crops.
  - (4) Training of the Indonesian officials and key-farmers associated with the pilot scheme.
  - (5) Organization and guidance on activities of farmers association in the area and provision of advice on farmers association to the farmers outside the area.

5. Exports

<u>Name</u>	<u>Specialty</u>	<u>Term of Duty</u>
Yoshiniko Ikei	Agronomy	Sep.1971-Aug.1973 (Team leader)
Masakuni Kawamata	Water Management	Sep.1971-Aug.1973
Dunkei Katoh	Farm Machinery	Sep.1971-Aug.1973
Toshio Shibata	Extension	Sep.1971-Aug.1973
Taiziro Kanai	Irrigation	Sep.1971-Aug.1973
Hidetaka Kouzuki	Liaison Officer	Sep.1971-Aug.1973

6. Counter-parts

<u>Name</u>	<u>Specialty</u>
Sudowo Sontokoosomo	Extension
M. Moenawir	Water management (Project manager)

Machmad Sudarmadji	Agronomy
Muljoto Suroso	Farm machinery
Endro Sunarke	Irrigation

7. Equipments and Machineries Provided by the Government of Japan  
(O.T.C.A)

Total amounts: \$51,518,000 (in 1971/1972)

They are: (1) Construction Machineries

- (a) Bulldozer 1
- (b) Tractor Shovel 1
- (c) Dump Truck 4
- (d) Hammer 5
- (e) Concrete Mixer 2
- (f) Concrete Vibrator 2
- (g) Grangate Tipe 429

(2) Farm Machineries

- (a) Auto-Thresher 12
- (b) Power-Sprayer 2
- (c) Full Auto Sprayer 15
- (d) Duster 30
- (e) Power tiller 20
- (f) Rice Processing Unit 1
- (g) Trailer 20

(3) Fertilizer and Agro-chemicals 41t

(4) Equipments for Center

- (a) Survey Implements
- (b) Laboratory and Experiment Implements

- (c) Generators 20KVA 3 sets
- (d) Water Supply Equipments
- (e) Station Wagon 1
- (f) Mini-Bus 1
- (g) Truck 1
- (h) Auto-cycles 6
- (i) Office Equipments

## II. ACTIVITIES OF THE PROJECT

### 1. (1) The policy

The Japanese experts have arrived here in Purwokerto on 6th Sep. 1971. The four Indonesian experts had been here since May to be the counter-parts for us while collecting the data concerned with the pilot area.

The pilot center was nearing completion except electricity and water supply facilities to be sent from Japan.

The main and secondary canals have been brought into completion in outline but not in a state of practical use.

The pilot area is a rain-fed cultivation area where one crop in a year is possible in a wet season.

It was just the time at the time of our arrival when the farmers were busy in preparing for paddy cultivation in the coming rainy season.

Taking these situations into consideration, we took the following policy of activities till March 1972.

#### (a) Construction of tertiary canals

To set to the construction work at the earliest possible time and to proceed it as much as possible though there may be possible difficulties due to rain-fall.

#### (b) Establishment of a demonstration plot

The pilot area of 200ha, a whole is the farmers' own; of which 1 ha is the center-owned for demonstration. To gain practical experience of rice cultivation under the Indonesian natural condition as early as possible through a trial in the demonstration plot. (Fertilizers and agro-chemicals were provided from the extension office in Pangjungs.)

(c) Making out of the operation plan.

(d) Guidance on a farm management organization and training of the key-farmers.

To provide guidance on the establishment of a farm management plan and organization, and to give the key-farmers training on them in preparation for the next dry season when irrigation water will become available.

(e) Improvements of center facilities-----electricity and water supply equipments in particular--.

(2) Results and problems of the activities up to the present

Things are hard to proceed as smoothly as expected in accordance with the above policies.

Rice cultivation through the planned farm management organization is now in a state of impracticability in this season. .. since the farmers has already begun transplanting rice each in his own way because of the uncertainty of the formal water introduction time and the incompleted farm management organization.

a. Tertiary canals

Excavation was completed in 90% of the whole.

No start has yet been made with the construction of the structures.

However constructions have been brought to completion of tentative outlets and excavation of the fourth canals by the farmers' Gotong Rojong under the guidance of the center. So water will manage to be taken into almost all the fields in the area in the dry season.

b. Water management

No defects have been found so far from a running test which had been conducted in the main canal by the Tadjum Irrigation Office since the beginning of May, all of which will secure water to the pilot area.

c. Trial cultivation in the plot

Trial cultivation with the use of C4 in the demonstration plot of 1 ha failed because of the outbreak of Gandjur. It is our study from this trial that the improved varieties like C4 and PB5 are impossible to be introduced in the cultivation of rainy season without proper counter-measures against Gandjur.

d. Guidance on a farm management organization

Although selection have already made of the leaders and staffs for the organization as in a separate paper, the organization is still on the stage of a paper plan because the grouping of the farmers is not started yet for the joint cultivation due to no detailed map made yet for each field and no agreement obtained yet from the farmers.

e. Operation plan

A operation plan for two years of 1972-1974 has been completed and detailed activities are now under compilation with a estimated cost for each of them.

f. Training of the key-farmers

The first training was held to collect the key-farmers for six days at the end of January in the presence of many a guest from the offices of Central Java Province Kabupaten Banjumas, Karsidenan, Kawodenan and Tadjum Irrigation Project.

3. Participants: The leaders and staffs of the farm management organization--40  
(Trainees)  
Pamong tani desa---2  
Extension workers---2  
Subjects: Cultivation technique, Water-management, Farm management org.  
Canals construction  
Lecturers: The Japanese and Indonesian experts  
The engineers of the Province,  
Karsidenan and Tadjum Irrigation Project

At the end of March two-day study tour was conducted with the participants of 25 key-farmers to Desa Puro, Kab. Bojonegoro where Dahana tirta--rural irrigation system--

is most advanced in this region.

G. Receipt of the equipments from Japan

All the equipments and machineries had already arrived at Tandjung Iriok by the end of March.

But some fertilizers and construction machineries are not delivered yet to the center.

It is made a rule to conduct checks over these delivered cargo together with the Indonesian experts and Padjum Irrigation Office.

So far no big damages or losses have been found yet.

h. Completion of the center facilities

Water supply and electricity generating facilities have been completed to set in by two Japanese experts who had been sent for this setting work from O.T.C.A.

The rice mill setting and well digging works are not brought to completion yet.

**2. Main Achievements**

There is no noticeable achievement made yet.

A booklet was compiled for the purpose of introducing this scheme. It is titled "The Padjum Pilot Scheme"--the concept of a farm management plan and organization----

**3. Others**

This scheme had been under the co-jurisdiction of the ministries of Public Works and Agriculture. The ministry of public works had been in charge of the construction of center facilities, irrigation canals and farm roads; the ministry of agriculture, the agricultural activities.

The scheme was transferred in its jurisdiction from the ministry of public works to agriculture and its official celebration was held on 18th May under the presence of both ministers and minister of information.

The remained construction works concerned with the scheme are still left under the responsibility of the ministry of public works.

## THE LAMPUNG LANI-MANGUR PROJECT

- I. In pursuance of the investigation carried out by the first Agricultural Survey Mission to Indonesia in September, 1971, the second Japanese Agricultural Survey Mission organized by the Overseas Technical Cooperation Agency visited Indonesia from 7th March to 15th April, 1972 to work out the details of the technical cooperation on the Lampung Agricultural Development Project.

The project is outlined as follows.

Note: The two experts, Mr. Y. Ohata and Dr. K. Nojima have been stationing in Lampung for the purpose of continuing further survey works and of making preparations for the experts to be dispatched as well. They are expected to station there for one year from 5th Feb. 1972.

## II. Master Plan

1. The Agricultural Extension Center with Extension Farm

The Agricultural Extension Center will cover the following activities for smooth and effective implementation of the Agricultural Development Scheme in Lampung, Province;

- (1) Data collection, analysis and information services on farmers' income, farm management, farmers' prices etc.
- (2) Technical advice and guidance necessary for the planning and implementation of the Scheme.
- (3) Field experiments and demonstration of new agricultural techniques
  - (a) Trials, experiments and demonstration concerning selection of rice and other crops to be introduced, selection of qualified varieties, fertilizer application, crop rotation and establishment of plant protection techniques.
  - (b) Trials, experiments and demonstration concerning soil conservation, sub-minor irrigation, water management and improvement of agricultural machinery and implements.
- (4) Training of extension workers and key-farmers
  - (a) Theoretical and practical training on improved agricultural techniques.
  - (b) Theoretical and practical training on utilization of agricultural machinery and on agricultural mechanization.



- (5) Multiplication and distribution of qualified seeds and seedling until the time the proper distribution system will have been established, within the framework of the Indonesian policy and programs on the development of a sound seed industry.
- (6) Other activities necessary for the promotion of the agriculture in Lampung.

2. Lowland Farming Development Sub-project ("Usaha Tani")

The project will be implemented in the paddy area of 10 Katjamatans, Central Lampung as a part of the Project, and a large scale demo-farm (about 100ha) will be set up in Katj. Punggur and about 40 small scale demo-farms (about 5ha) will be set up in 10 Ketjamatans.

The following activities will be conducted integrately in the demo-farms to improve the farm productivity in order to increase farmers' income and thereby to improve their living standard;

- (1) Introduction of improved rice cultivation and multicropping techniques including rearrangement of agricultural infrastructure based on the results of trials and experiments in the Center, and the demonstration at the demo-farm of improved rice cultivation techniques, such as the use of qualified varieties, fertilizer application, plant protection, water management, harvesting and processing.
- (2) Extension of improved farming techniques to farmers in the area by round-trip guidance based on the demo-farms.
- (3) Training of farmers and organization and strengthening of farmers' groups;
  - (a) Technical training on improved rice cultivation techniques for farmers at the demo-farms.
  - (b) Organization and strengthening of farmers' production groups to promote group activities.
- (4) The promotion of a sound distribution system of agricultural materials and the system for rural credit.
- (5) Data collection of farmers' income, farm management and farmers' prices in the field.
- (6) Proper guidance of farm management to the farmers by utilizing the results of analysis in the Center.

3. Upland Farming Development Sub-project ("Balawidja")

The following activities will be conducted in line with the policy and programme of the Government of Indonesia on upland products, such as maize, legumes, cassava and perennial crops in the upland farming area of Central and South Lampung as part of the Project, concentrating the efforts to the demo-farms in selected Desas.

- (1) Introduction of improved upland farming techniques based on the results of trials and experiments in the Center, and demonstration, at the demo-farms and trial plots such as the use of qualified varieties, fertilizer application, plant protection, harvesting and processing as well as cropping system.
- (2) Extension of improved farming techniques to farmers by round-trip guidance.
- (3) Training of farmers and organization of farmers' groups;
  - (a) Technical training on improved upland farming techniques for farmers.
  - (b) Organization of farmers' groups to promote and develop the activities.
- (4) The promotion of a second distribution system of agricultural materials and the system for rural credit.
- (5) Data collection on farmers' income, farm management and farmers' prices in the field.
- (6) Proper guidance on farm management to the farmers by utilizing the results of analysis in the Center.

The programmes conceived is as follows;

	1st year	2nd	3rd	4th	5th
Number of Kotjaratan	2	3	4	5	5
Number of Desa	4	8	16	32	32
Number of trial plot	7	11	28	56	56

#### 4. (1) Experts to be Dispatched

Team Leader

The Center  
Extension

Lowland Cultivation  
 Upland Cultivation  
 Farm management  
 Soil and fertilizer  
 Machinery  
 Pest control

Lowland Farming Development Sub-project  
 Extension  
 Cultivation  
 Irrigation

Upland Farming Development Sub-project  
 Extension  
 Processing  
 Cultivation

Coordinator

Total 15

Note: (1) Eight experts will be dispatched for the first year, and maximum fifteen for successive year.

(2) Specifications of experts maybe changed by the decision of the Joint Committee, if necessary.

(2) Counter- Parts

	<u>1st year</u>	<u>2nd.</u>	<u>3rd.</u>	<u>4th.</u>	<u>5th.</u>
Project Director	1	1	1	1	1
The Center					
Head	1	1	1	1	1
Lowland cultivation	1	1	1	1	1
Upland cultivation		1	1	1	1
Farm management	1	1	1	1	1
Soil and fertilizer	-	1	1	1	1
Machinery	1	1	1	1	1
Pest control	-	1	1	1	1
Total	6	8	8	8	8
Lowland Farming Development Sub-projet					
Extension workers	4	4	10	10	10
Upland Farming Development Sub-project					
Extension workers	4	4	4	6	6

5. The Articles to be Provided by the Government of Japan

- (1) Construction equipment, machinery and spare parts
- (2) Agricultural machinery and implements and their spare parts
- (3) Pesticides, fertilizers and other materials
- (4) Machines and tools for repair work
- (5) Tools and implements for testing work
- (6) Equipment, instruments, tools, spare parts and other materials for laboratory work
- (7) Equipment and materials for public utilities
- (8) Vehicles
- (9) Teaching materials including audio visual aids
- (10) Other necessary minor equipment and materials

