

**REPORT OF THE JAPANESE TECHNICAL GUIDANCE  
AND SURVEY MISSION FOR AGRICULTURAL  
COOPERATION IN WEST JAVA, INDONESIA**

**MARCH, 1969**

**OVERSEAS TECHNICAL COOPERATION AGENCY**

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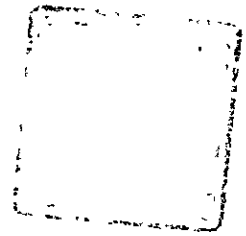
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## FOREWORD

In view of the great importance of agriculture sector in developing countries and in response to the increasing requests for technical cooperation in this sector, our Agency established in 1967 the Agricultural Development Cooperation Office. The task of this new Office is to carry out technical cooperation for agricultural development projects.

Since the inauguration of the Office in our Agency, such projects were selected in six countries in South-East Asia and two countries in South-West Asia.

Among these projects, the Food Production Increase Project in West Java was the first one for which feasibility study was carried out. The agreement for technical cooperation on this project was signed in May 1968 between the governments of Japan and Indonesia. Subsequently a group of Japanese experts were dispatched to the project area together with the provision of equipments and materials.

As the project went into operational stage, our Agency organized an advisory team to investigate the project operation and give advise on various technical problems. The team, headed by Dr. Hashimoto of the Kyushu Agricultural Experiment Station of the Ministry of Agriculture and Forestry, made a visit to the project area in January 1969.

The team studied on the spot various problems and discussed with the Japanese experts stationed there as well as the Indonesian staff-members of the project.

The observation and suggestions of the team, as contained in this report, would be useful for the successful implementation of the project. It is also hoped that the report would also serve as a useful guidance for similar projects in other developing countries.

Grateful thanks are due to officials of the Indonesian Government who so heartily rendered help to the team in providing data and information for the survey.

March 1969



Shin-ichi Shibusawa  
Director-General  
Overseas Technical Cooperation Agency

## Introduction

In Indonesia, the goal of economic reconstruction is set, together with the political stabilization, at increased food production, and energetic efforts have been made to develop domestic agriculture. By the BIMAS plan (Group Guidance Programme to Attain Self-sufficiency in Food) started in 1965, the more towards increased food production became realized.

Furthermore, starting in April this year, a 5-year plan for food production increase is to be put into effect, and for that purpose the fiscal year was revised to start in April and end in next March.

According to the agreement Concerning Agricultural Technical Cooperation concluded between Indonesia and Japan on the 29th of May, 1968, Japan sent five agricultural experts last September, through Overseas Technical Cooperation Agency, experts, and at the same time supplied materials such as agricultural machinery, fertilizers, etc. to cooperate in the promotion of food production increase plan in Indonesia.

The Itinerant Guidance and Survey Team was organized by Japanese Government and was sent to that country at the request of Mr. Kazuma Sugo, head of the dispatched experts above mentioned.

The Team reviewed the progress and accomplishments of the 3 plans based on the Agreement, which are;

- 1) Seed Inspection Officials Training Plan.
- 2) Mechanization of Agriculture Plan.
- 3) BIMAS Plan at Tjihea farm.

The team also examined the problems in the fields of soil and fertilizer, insects and plant diseases, agricultural management and agricultural engineering. Although the survey was conducted for only 3 weeks, through the active exchange of view with the local expert group and the earnest discussion with staff of the Ministry of Agriculture in charge of the execution of the project, problems that may arise during the course of enforcement of the Technical Cooperation Government between the two countries appear to have been clarified.

We should be happy if the current report could be of help to the technical cooperation between Indonesia and Japan.

Our deepest thanks have to be expressed here to the Indonesian parties concerned as well as to the members of Japanese experts dispatched, for their cooperation and assistance in the fulfilment of our task.

Hidenori, Hashimoto

Leader, Itinerant Guidance and Survey Team  
for Java Food Production Increase Cooperation  
Project, West Indonesia.

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I. Purpose of the team.

This Itinerant Guidance and Survey Team, sent from Japan on the request of Japanese experts (Project Leader: Dr. Kazuma Sugo) dispatched to Indonesia under the "Agreement between Indonesia and Japan concerning technical cooperation for the development of Indonesian Agriculture" signed by the two countries on the 29th of May 1968, had the following purposes:

1. Answering the questions from the experts to advise on the future cooperation method in the fields of soil and fertilizer, insects and diseases, agricultural management, and agricultural engineering, for the improvement of rice cultivation.
2. To exchange views with the Indonesian government officials concerned and the Japanese experts, on the present situation and future problems of the work carried on under the Agreement, including.
3. Other relevant items.

II. List of the team members.

Name	In charge of:	Occupation in Japan
Hidenori Hashimoto	Soil and fertilizer, leader of Team	Chief of 3rd Soil and Fertilizer Laboratory, 2nd Environment Division, Kyushu Agricultural Experiment Station, Ministry of Agriculture and Forestry.
Tatsuhiko Shinoda	Insects and plant diseases, assistant leader	Technical councilor, deputy chief of Agricultural Development Cooperation Office, Overseas Technical Cooperation Agency.
Kazuhiko Nitta	Agricultural economy	Senior official of International Cooperation Group, General Affairs Section, Agriculture, Forestry and Fisheries Technical Council, Ministry of Agriculture and Forestry.
Takeo Nasu	Agricultural Engineering	Senior official of the 2nd Group in charge of prefectural construction work, Irrigation and Drainage Section, Construction Division, Agricultural Land Bureau, Ministry of Agriculture and Forestry.

Sakae Tsurumi	Liaison and Coordination	Assistant Councilor of Osaka International Training Center, Overseas Technical Cooperation Agency.
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### III. Itinerary

1969 Feb. 13 (Thurs.)	<p>The team left Haneda Airport, Tokyo, at 9:00 A.M. on Jal flight No. 711.</p> <p>Arrived at Djakarta International Airport at 22:25. Met at the airport by Mr. Hirai, 1st Secretary of the Embassy of Japan, Mr. Sugo, project leader, and Japanese experts and staff members of the organs concerned.</p> <p>Headed straight for Wisma Wutama Hotel in Djakarta, got a briefing in the lobby from Mr. Hirai on the progress of negotiations with Indonesian side regarding the project, the progress of the project so far, and consulted with the parties involved on the later schedule.</p> <p style="text-align: right;">(Stayed in Djakarta)</p>
Feb. 14 (Fri.)	<p>Visit Embassy of Japan then the Ministry of Agriculture of Indonesia, Government and greeted chief of Secretariat Section of General Agricultural Affairs Bureau. Listen to the explanation by professor Motooka, Indonesian Coordinator of Asian Development Bank, on the present status of the technical cooperation from other countries and the difficulties therein.</p> <p>Visit the offices of Agricultural Viceminister and Chief of General Agricultural Affairs Bureau, talk about the appointments with the Vice-minister and Chief of General Agricultural Affairs Bureau.</p> <p>Greet Mr. Hutobarat, in charge of international cooperation.</p> <p style="text-align: right;">(Stay at Bogor)</p>
Feb. 15 (Sat.)	<p>Greet Chief of the Central Agricultural Research Institute (Prof. Dr. B.H. Go). Visit the institution's Agronomy Division, Insects and Diseases Division, Irrigation Bureau of the Ministry of Agriculture, and consulted on the schedule of survey.</p> <p>Visit Muara Experiment Station, and talk with Chief of Extension Bureau of the Ministry of Agriculture (Mr. Sugandhi), at the station at that time.</p> <p style="text-align: right;">(Stay at Bogor)</p>
Feb. 16 (Sun.)	<p>All members of the team visit the botanical garden. Inspect markets in and around the city of Bogor.</p> <p style="text-align: right;">(Stay at Bogor)</p>



	Call on Japanese Ambassador Yagi and Minister Miko at the Embassy of Japan.
	Visit Extension Bureau, briefed on the Bimas Plan, visit Educational Bureau of the Ministry of Agriculture, Central Agricultural Research Institute (Agricultural Machinery Dept.), and make consultations.
	(Stay at Bogor)
Feb. 18 (Tues.)	Visit Chief of Education Bureau (Mr. Sujitno), and Director General Agricultural Affairs Bureau (Mr. Sadikin) and exchange views. Promise another meeting with Mr. Sadikin, Chief of General Agricultural Affairs Bureau. Pay respects to agricultural Vice-minister at the Ministry of Agriculture. (Drs. Mashud Wisnusputra)
	(Stay at Bogor)
Feb. 19 (Wed.)	Investigation in the Tjihea district, inspect the experiment fields and the storehouse and other facilities for keeping fertilizers and materials sent from Japan. Exchange opinions with the Indonesian counterpart.
	(Stay at Bogor)
Feb. 20 (Thur.)	Inspect the test fields in the cool highland district of Bandung. Visit the well managed model farm (Mr. Odong's) in the village of Tjibotas. Fill the questionnaire on the management of the farm. Inspect Djatiluhul Dam. Discussion about the results of investigations between all of the team member and Japanese experts.
	(Stay at Djatiluhul)
Feb. 21 (Fri.)	Visit the Institute of Sang Hyang Seri at Sakamandi, and after hearing explanations about the plan of experiment fields etc. of the Institute, inspect its field, storehouse for agricultural machinery and other facilities.
	(Stay at Djakarta)
Feb. 22 (Sat.)	Examine with the experts on the results of investigations, future survey areas and other relevant matters at Muara Experiment Station.
	(Stay in the suburbs of Bogor)
Feb. 23 (Sun.)	Rest
	(Stay at Djakarta)

Feb. 24 (Mon.)

Together with the Indonesian parties, the team was divided into groups and carried out surveys and studies on technical problems in each specialized field through Feb. 28 (Fri.).

All members of the team and the Japanese experts gathered at Muara Experiment Station for consultation.

Team leader Hashimoto and member Tsurumi went to Agronomy Division of the Central Agricultural Research Institute to exchange informations with Mr. Abdulah about the experiments and studies on soil and fertilizer, and heard about the soil conditions and other environmental factors of that district. (in company with the Project Leader Sugo and other experts)

Assistant leader Shinoda exchanged opinions with Mr. Oka, chief of the Insect and Disease Division of the Central Agricultural Institute, on the outbreak and control of major insects and diseases, and also surveyed the area. (expert Seki accompanying) For the preparation of additional survey in Tjihea district, team members Nitta and Nasu inquired of expert Funada about the situation in detail, at Muara Experiment Station.

(Stayed at Djakarta)

Feb. 25 (Tues.)

Team leader Hashimoto inspected the Soil Research Institute at Bogor, exchanging views with the staff there.

Assistant leader Shinoda continued consultation and investigation at the Insects and Disease Division of the Central Agricultural Institute.

Members Nitta and Nasu visited Professor Motooka, coordinator in Indonesia for the Asian Development Bank, and inquired about the contents of Indonesia's new 5 year development plan. And also about the present situation of agricultural technical cooperation extended from other countries. Member Tsurumi carried out liaison and coordination work in Djakarta.

(Stayed at Djakarta)

Feb. 26 (Wed.)

Leader Hashimoto, assistant leader Shinoda and member Tsurumi visited Mr. Sugandi, chief of the Extension Bureau, at Pasarminggu, and conferred on the problems that may arise with the Food Production Increase Campaign. They also inquired about and exchanged ideas on the selection of

	<p>cultivated varieties (paddy rice), and the extension of disease resistant varieties.</p> <p>(Project leader Sugo in company)</p> <p>Members Nitta (survey on agricultural cooperatives and extension) and Nasu (Irrigation and drainage facilities) carried out complementary surveys at Tjihea district.</p> <p>Survey team gathered once again at Bandung to discuss on the future survey plans.</p> <p style="text-align: right;">(Stayed at Bandung)</p>
Feb. 27 (Thurs.)	<p>Took rest as it was a national holiday in Indonesia.</p> <p style="text-align: right;">(Stayed at Djakarta)</p>
Feb. 28 (Fri.)	<p>Team leader Hashimoto, assistant leader Shinoda and members Nitta and Tsurumi visited Mr. Sujitno, chief of Education Bureau, at Pasarminggu, and exchanged views in detail on the training programs with the Indonesian parties concerned. (project leader Sugo and expert Haga together)</p> <p>Reported on the results of the survey at the Embassy of Japan on the way back.</p> <p>Member Nasu visited the office of Agriculture Vice-minister at the Ministry of Agriculture.</p> <p style="text-align: right;">(Stayed at Djakarta)</p>
Mar. 1 (Sat.)	<p>Team leader Hashimoto, assistant leader Shinoda and member Nitta held a discussion meeting for the second time at Muara Experiment Station with all of the dispatched Japanese experts to examine and summarize the survey results.</p> <p>Member Nasu visited Agriculture Viceminister's office in the Ministry of Agriculture and inquired of the official in charge about the present status of the project.</p> <p>Member Tsurumi carried out liaison and coordination work in Djakarta.</p> <p style="text-align: right;">(Stayed at Djakarta)</p>
Mar. 2 (Sun.)	<p>As it was scheduled to have discussions with Indonesian counterparts and parties concerned on the 4th of March at the Ministry of Agriculture, a brief report of the survey results was prepared for each field of survey.</p> <p style="text-align: right;">(Stayed at Djakarta)</p>
Mar. 3 (Mon.)	<p>Final discussion with all of the dispatched experts at Muara Experiment Station, based on the brief reports prepared, in preparation for the examination conference with the Indo-</p>

nesian parties to be held on the 4th of March.

For the preparation of the conference member Tsurumi visited Japanese Embassy to carry out liaison and condition work.

(Stayed at Djakarta)

Mar. 4 (Tues.)

Final talks with the Indonesian counter parts and officials in charge (Chairman, Mr. Sujitno, Chief of Agriculture Ministry's Education Bureau), on the survey results, held at the conference room of the General Agricultural Affairs Bureau of the Ministry of Agriculture. (All members of the dispatched experts participated).

Luncheon party was held by the survey team, with 4 members of the Indonesian counterparts and officials concerned first secretary Hirai and dispatched experts were invited.

(Stayed at Djakarta)

Mar. 5 (Wed.)

Leader Hashimoto and members Nitta, Nasu and Tsurumi left Djakarta for Japan by JAL flight No. 712.

Assistant leader Shinoda left for Thailand by CX flight No. 502, to make surveys and inspections concerning Agriculture Development Cooperation in Thailand.

#### IV. Results of the Survey.

The outline of the results of the survey conducted by this team for three weeks starting February 13th, with the help of those from the Indonesian Government and experts from Japan, is as follows.

##### I. Summary (Oral report to Indonesian Chief of General Agricultural Affairs Bureau Mr. Sadikin).

A. Present status of the project and problems involved 9 months have passed since the Agreement was signed, and it is now 6 months after the arrival in Indonesia of the Japanese experts. During this time the Japanese experts have participated once in the training of seed inspectors at Muara, once in the training for agricultural mechanization at Sakamandi and several times at Tjihea in the basic research and consultation programme for farm management guidance, mostly acting as advisers.

But, because of the fact that the materials, supplied by the Japanese government as a means of training and guidance for this project, had not arrived in time and because the Japanese experts needed time to get accustomed to the circumstances and to understand agriculture in the country, the stages up to now appears to have been preliminary. Preliminary stages like this are regarded as always necessary for any kind of project, but in the case of the current project, especially concerning the supply of materials, more efforts are needed on the part of both parties concerned, on Japanese side as well as on Indonesian.

However we do take this as the sort of problem that, as we look back later, may appear unavoidable and necessary, as this is the first case of this kind.

##### B. Future plan of the project and the problems therein.

Although the full scale execution of this project, agreed in the Agreement, is to start with the arrival of the provided materials, we think the following measures are necessary to attain maximum results in the training of seed inspectors and for agricultural mechanization, to say nothing of the farm management guidance program at Tjihea.

- i) Practical experiments to get basic materials for training.
- ii) Establishment of demonstration farms to prove the results of training.
- iii) Extending least amount of necessary materials to that they can fully display the result of training.
- iv) The complete fulfillment on the side of the Indonesian government of items provided in the articles of the Agreement. Especially in securing the finance for necessary local costs needed by the Japanese experts, and also in consolidating the facilities such as storehouses for agricultural machinery.
- v) More earnest concern by both Japanese and Indonesian government officials

in the handling of supplied materials. (For example, problems of tax, and transportation of fertilizers should be solved beforehand.)

### C. Other relevant matters

The question of whether Japan has any intention of cooperation in extending this project in Central and East Java and in oversea areas of Sumatra, Kalimantan and Celebes, was asked by Vice-minister of agriculture (Dr. Mashud Wisnusaputra) at the time when the team payed respects to him.

We answered then that the survey team had no authority to give views to the question, and that although the team would not fail to report to the Japanese government on the matter proposal, Indonesian government should send the propoed through official routes.

Later in the course of discussions among Japanese experts and the team, we reached the conclusion that to gradually promote such programme over a wider range would be very effective for achieving food production increase in Indonesia. We intend to attach the team's suggestion to the report to be submitted to Japanese government. Besides, it was agreed at the discussion that in carrying out such a project, more effect would be expected if the following measures are put into effect. It is desirable that note is taken of our hope that this opinion of ours too would be attached to the report to the Japanese government.

In order to get a leap in rice production increase the following measures should be taken with close connection between researches, education and training, extension service and administration.

i) Concerning research and experiment:

Dispatch of experts on soil and fertilizer, on plant diseases and insects, particularly in the field of rice cultivation, and supply of materials for research work.

ii) Dispatch of advisers on land improvement needed for food production increase, when requested by Indonesia Government, send a survey team and advisers for execution plan to carry out land improvement and consolidation at Tjihea, Sakawandi and other districts.

iii) Send a high-level adviser to the General Agricultural Affairs Bureau, to act as a coordinator for Japanese cooperation projects and adviser to the food production increse plan in Indonesia.

These are the results and conclusions of the survey. However, while these results and conclusions are, needless to say, to be included in the report of the team to Japanese Government, they will not in the least represent any opinion or intention of the Japanese Government. We should like to add that Japanese Government bears no responsibility against Indonesian Government on account of this report.

To end the report, we would like to thank you from the bottom of our hearts, for the cooperation and kindness given by your government officials to this survey team.

## 2. Specific Conclusions

### A. On soil and fertilizer

Indonesia's intention of promoting the increase in her rice production is clearly seen in the new 5 year plan of food production increase, to be started in April this year.

In the course of realizing rice production increase in the country so strongly demanded, however, many difficulties might be encountered.

Besides the dissemination of improved rice varieties and the improvement of irrigation facilities, fertilization is one of the most important works at present, together with the control of insects and diseases. Unfortunately, we found that the number of researchers in the field of Edaphology in the country was extremely small, and that research facilities were incomplete too.

As a result of such conditions we understood that even basic data on fertilization are lacking for the moment. Looking at the current situation as stated above, it should be particularly emphasized that first of all a number of researchers in the field of soil and fertilizer are to be trained and an increase in the research staff be attained.

There is necessarily required at the same time that improvement and expansion of research facilities should be completed as soon as possible.

However, even at the present stage, a series of important basic experiments as listed below seems to be possible and is desired to be carried out.

Immediate start on these experiments is strongly urged.

#### 1) Identification of the quantity of natural supply of nutrients.

It is essential to carry out the 3 element tests in paddy fields in the main districts where soil nature and land conditions differ considerably, and to find out the quantity of natural supply of nutrients from soil and rivers (irrigation waters).

#### 2) Determination of proper amount of 3 elements to be applied to paddy fields.

Along with the 3-element experiments above stated, there needs to be another group of 3 elements tests, for each major variety of paddy rice, under the same conditions as the former ones. And thus the proper amount of application of each nutrient for different varieties should be decided. Apart from the field of study described so far, I would like to stress that, generally speaking, soil fertility could be remarkably raised by application of organic materials (fresh straw, farm manure, green manure, etc.), while the improvement of basic conditions of cultivated paddy land, including the separation and completion of irrigation and drainage canals, would result in increasing the effect of fertilizers applied, and in turn contribute greatly to the increased production of paddy rice.

## B. On Insects and plant diseases

From the friendly discussion with Mr. Ir. N. Oka, chief of Insects and Diseases Division of the Indonesian Central Research Institute for Agriculture and other parties concerned, and from the results of survey carried out in the area, although the time was quite limited, I summarize the conclusion about the problems of insects and plant diseases in Indonesian paddy rice culture as follows:

### 1) Recognition of present status.

Food production increase in Indonesia is hindered seriously by damages caused by insects and diseases. Particularly the newly introduced varieties PB5 and PB8 are very susceptible to bacterial leaf blight. With the expansion of these varieties it is feared the occurrence of this disease becomes more often and the damage accordingly be enhanced. Counter measures against this disease should promptly be established.

At the same time, since it was generally observed over the whole area of rice culture that damages caused by rice blast, rice stem borers and rodents were considerably heavy, ecological facts about these organisms should also be made clear and measures to control them need to be immediately put into effect.

On the other hand, in the field of research, the number of researchers is quite small and facilities and materials for research seem to be inadequate. Especially in the sectors of plant pathology and study on rats (of the latter, the same can be said in Japan), it seems to be urgently required to replenish the needs as soon as possible. As to the instruction activities concerning insect and disease control, although there was hardly any time to see the actual situation, I do hope the Crop Protection Service, scheduled by the Extension Bureau, prove its effects very quickly.

### 2) Countermeasures

Regarding the countermeasures against insects and diseases, close connection with researches is particularly important, and because their true achievements can be appreciated only when the results of researches are reflected on administration and extension services, I think that the replenishment of researchers, budget and facilities in this field of study is the most pressing issue.

I would like to state here – although this is only my personal view – that in the framework of Japan's technical cooperation programme, it might be recommended to lay emphasis on the work concerning the ecological study and control of bacterial leaf blight and rice blast, and on the outbreak forecast service for rice stem borers.

## C. On farm management

– Agricultural cooperative society in Tjihea –

The following observations concern an agricultural cooperative in Tjihea. It should be acknowledged that Mr. Funada, Japanese expert, Mr. Basah of West Java State Government and Mr. Memed, Director of Tjihea Farm accompanied me during the field study.



Cop. Kesedjakhkrian Rengarap P.P. Tjihea is an agricultural cooperative in Tjihea established on December 30, 1964. Its jurisdiction extends over a former estate covering five villages. As of 1968 it has as its member 1,680 persons including 1,083 males and 597 females, and is managed by eleven directors and four officers.

The cooperative is mainly concerned with the purchase and sale of fertilizers and the loaning of operating money to farmers. They are principally financed by membership fees (200 RP per person per year and payment in installments at each crop). BIMAS credit is also utilized. In addition to these main lines of business the cooperative lends rice to farmers at time of shortage. The rice is made available from reserves which are built up by repayment in rice. The farmer must repay in rice 20 percent equivalents in addition to total amounts of money advance. This system is meeting a great favor among the members. Also, the cooperative purchases a small portion of rice at harvesting time.

Most members cultivate paddy field of 0.5 to 1.0 ha on which they raise two crops annually. Many of them have side jobs. From the standpoint of school career some members are graduates of agricultural middle school or high school, although most attended only six-year elementary school.

Final remarks might be made. This newly established cooperative can be said to be still at developing stage. However, its members have strongly felt the necessity of the agricultural cooperative through experience. With such support, I believe, it will soon come into full play as spearhead of production increase movement in the district.

#### D. On Agricultural Civil Engineering

##### – Field Adjustment in Tjihea –

According to the Agreement between the Governments of the Republic of Indonesia and Japan concerning Technical Cooperation in the Field of Indonesian Agriculture the project in Tjihea, Tjiandjur, is to 'promote rice cultural technique, farm mechanization, small scale land improvement, farm cooperative activities and rice seed production. The priority in this plan is given to the establishment of a 'pilot farm' after land improvement on a small area. The pilot farm is to demonstrate mechanized modern farming practices to farmers.

The farm will cover a total area of 100 ha consisting of four 25 ha fields. It is understood that all of its management including improvement of land conditions should be placed in the hands of Indonesians, and that the role of Japanese experts should be limited to the provision of guidance and advice whenever necessary.

Tjihea belongs to an irrigation system which extends over 5,000 ha and is fed by the Tjisocan, tributary of the River Tjitarum. It is told that the irrigation facilities were built in the 1920's. Canals are not lined and are considerably outworn. Supplementary canals are inadequate so that not all parcels of the farm are directly accessible to water. Thus not a few parcels take in water from adjacent ones.

The immediate need for providing enough water during dry season has apparently led to negligence of drainage canals. No drainage canal exists. All the canals serve mainly for irrigation purpose and use for drainage canals is secondary. Thus the presence of diversion work and other equipment for irrigation causes insufficient drainage at the time of flooding. In fact paddy fields totalling approximately 200 ha are considered as waterlogged.

Although fields are fairly well arranged consolidation is still required for effective operation of proper farm machines.

The trunk road connecting the area and the Bogor-Bandung highway is too badly damaged on the surface for driving of motorcars except jeeps. Repair plan reportedly scheduled should be carried out at an early date. Another problem is narrow roads of the area. Most roads are less than 1 meter in width. This might hinder transportation of cultivation machines.

Influenced by long tradition irrigation techniques of Indonesia are well-advanced in planning, design and construction. Clear evidence of this fact is provided by various irrigation projects presently undertaken by Indonesian Government. These projects are chiefly under the jurisdiction of the Ministry of Public Works.

In the Tjihea Project the Ministry of Agriculture is responsible for its execution and the 'small scale land improvement' will be carried out by the Irrigation Bureau of the Ministry. However, the Bureau is only concerned with maintenance, operation and repairs of irrigation canals. A large scale project is apparently beyond its capacity.

Only 1:5,000 topographical map is available for Tjihea at present. No level survey has ever been carried out. Nor there is such a plan in future. Since level survey is essential for any kind of field adjustment, such survey is strongly recommended.

It seems that the future extension is envisaged of the demonstration farm into the entire area of Tjihea which covers 1,000 ha, making it a model for modern farming based on mechanization. In such case, as might be concluded from foregoing, overall land improvement is a prerequisite. This includes repairs of trunk roads, planned arrangement of field roads and irrigation and drainage canals, and rearrangement of parcels. And it is desirable to consider the 100 ha demonstration farm as a part of the 1,000 ha project if it is possible.

If the Indonesian Government should request the dispatch of Japanese experts in connection with field adjustment in Tjihea it is recommended that the members should be selected for the execution planning of land improvement.

