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Report of the Evaluation Team for Tajum Pilot Scheme In Indonesia

February 1974

Department of Agricultual Cooperation
Overseas Technical Cooperation Agency
(OTCA, Tokyo, Japan)

CONTENTS

I. Purpose of the Team

The Government of Indonesia planned "Tajum Irrigation Project" as a part of its five year "National Development Plan" (REPELITA-I) to build the trunk waterways system and a second such system for the purpose of irrigating about 3,200 ha. of paddy fields in the Tajum area of Kabupaten Banyumas Central Java. The construction was begun in August, 1965. Later in 1968, it was decided to accept a loan (an aggregate amount of US$ 990,000) for Asia Development Bank (ADB) for expediting the irrigation project. In connection with this, the Asia Development Bank advised the construction of a pilot ground in the planned irrigation area in order to increase the effect of the "Tajum Irrigation Project". This prompted the Government of Indonesia to request the Japanese Government to cooperate in expediting that plan.

Upon receiving the request for the above cooperation, the Japanese Government (i.e. OTCA entrusted to act on behalf of the Government) carried out the Preliminary Survey in October, 1969 and the Detailed Design Survey in February, 1970 simultaneously executing the Record of Discussion.

Based on the Record of Discussion the negotiation for an accord on the "Technical Cooperation for Tajum Pilot Scheme" proceeded toward finalization and was signed as an "Agreement between the Japanese Government and the Government of the Republic of Indonesia regarding the Tajum Pilot Scheme" in February, 1971.

Accordingly then, six specialists were delegated in September, 1971 to mark an all-out commencement of the cooperation on the plan.

In accordance with the above-mentioned developments, cooperation on the plan has been carried out as had been anticipated and will see the agreement expire in about six months time (February 15, 1974). Therefore, this evaluation plans to make policies for our continued cooperation after the Agreement expires (including a study on whether or not the agreement should, in fact, be extended).

It has also been planned to approach the Government of Indonesia for opinions and comments concerning the follow-up plan to the "Agreement regarding the West Java Increase Food Project" which expires in May, 1974. For this plan we shall also render our technical support as in the case of the "Tajum Pilot Scheme".

II. Member and Schedule of the Team

II-1. Member of the Team

(1)	Osamu MAEDA	Leader/Water management Construction Dept., Structural Improvement Bureau, Ministry of Agriculture & Forestry (M. A. F.).
(2)	Takeo KAWASHIMA	Member/Cultivation Planning Dept., Kanto Agricultural Administration Bureau, M. A. F.
(3)	Seiji NAKAMURA	Member/Agricultural extention Agricultural Administration Dept., Prefectural Office of Kanagawa-Ken
(4)	Ken UESUGI	Member/Farmers organization Planning Dept., Structural Improvement Bureau, M. A. F.
(5)	Koji TANABE	Member/Liaison Agricultural Cooperation Dept., O. T. C. A.

This report has been jointly written. The contributers are as follows: "Conclusion" and "Irrigation and Water Management" by O. Maeda, "Cultivation" and "West Java Food Increase Project" by T. Kawashima, "Agricultural Extension" by S. Nakamura, "Farmers Organization" by K. Uesugi and "Purpose of the Team" and other contributions (as well as compiling work) by K. Tanabe.

There is some repetition in "Cultivation", "Agricultural Extension" and "Farmers Organization", which are left as such due to the nature of the content where they arise.

Although this report is entitled "Report of the Evaluation Team for the Tajum Pilot Scheme in Indonesia", we must state that we cannot present here the objective standards for these evaluations, since the methodology and standard for evaluating the technical cooperation has not yet been established.

II-2 Schedule of the Team:

1972

July 16th (Mon.)	Four members (excluding Mr. Maeda, the chief of the Team) leave Tokyo, arrive Jakarta.
17th (Tues.)	Meeting with Mr. Sugimoto, Secretary from Embassy and Mr. Sugiyama, Director, O. T. C. A. Office. Courtesy call and meeting at Ministry of Agriculture, Indonesia.
18th (Wed.)	Visit to LP3, Bogor. Briefing by Dr. IWATA. And then visit to Muara, briefing by Mr. Sugo, and other Experts on West Java Project. Visit to the Extension Center (P3), Kabupaten Bogor.
19th (Thurs.)	Visit to the West Java Province Farm, Cihea Receive briefing.
20th (Fri.)	Visit to the Diperta Jawa Barat, in Bandung. Courtesy call on the Inspector and others. Receive opinions and comments from West Java Province officials on "West Java Project" following the agreement expiry date.
21th (Sat.)	Visit P3 and their demonstration plots at both Kabupaten Krawang and Bekasi.
22nd (Sun.)	Leave Jakarta, arrive Purwokerto.
23rd (Mon.)	Courtesy call on the Project manager and other staffs at the Pilot Center. Discuss schedule and other items. Receive briefing by the Experts team on the actual situation of the "Pilot Scheme".
24th (Tues.)	Visit to the "Pilot" area, Curtesy call on Bapak Lurah of Desa Bantar and Kelurahan Tinggarjaya and receive their comments on the "Pilot Scheme".
25th (Wed.)	Receive comments and explanations about the "Scheme" from the "Project" manager at the "Center".
26th (Thurs.)	At the "Center", joint discussion with the Japanese and Indonesian Experts team.

27th (Fri.)	Meeting with the Experts team at the "Center". Individual survey by assigned members.
28th (Sat.)	Visit to the Banyumas Agriculture Bureau for a courtesy call and receive comments on the "Pilot Scheme". Mr. Maeda leave Jakarta, arrive Purwokerto.
29th (Sun.)	Meeting with the Experts team mainly for the benefit of Mr. Maeda having just arrived.
30th (Mon.)	At the "Center". Final joint meeting with the Japanese and Indonesian Experts Team. Present the general views of the "Team".
31st (Tues.)	Leave Purwokerto, arrive Jakarta. Meeting with Messrs. Sugimoto and Sugiyama at the Embassy. At the preparatory meeting for the second joint conference of Agricultural Technical Cooperation Project (scheduled for August 1st), views of the Team on Tajum Pilot Scheme should be presented.
August	
1st (Wed.)	Meeting among "Team" members. The "Second Joint Conference of Agricultural Technical Co-operation Project" to be held.
2nd (Thurs.)	Meeting with Messrs. Sugimoto and Sugiyama at the Embassy. Meeting at Ministry of Agriculture, (Indonesian Government), mainly to receive Indonesian views on the "Pilot Scheme".
3rd (Fri.)	"Team" meeting: Final meeting at the Embassy for compiling study results into a summary report.
4th (Sat.)	Meeting at Ministry of Agriculture, Indonesia with Mr. Sumantri, Vice-Director of the Directorate of Agriculture General and other staff members for the final discussion. (N.S.) "Brief Report" to be submitted.

5th (Sun.)	Break
6th (Mon.)	Arranging survey findings in order.
7th (Tue.)	
8th (Wed.)	Leave Jakarta, arrive Tokyo.

III. Conclusion:

1. Activities of Evaluation Team:

Main part of evaluation team arrived Jakarta July 16th. Made arrangements for the study with Japanese Embassy and Ministry of Agriculture, Indonesia and flew to Purwokerto July 22nd to immediately initial field study and togather opinions through interviews.

On the evening of July 28th, all team members were united and on July 30th, had the last joint meeting with Indonesian staff in the Pilot Center. Returned to Jakarta July 31st to attend the preparatory meeting for the "Indonesia-Japan Joint Conference for the Agricultural Technical Cooperation Project" which was scheduled to be held August 1st.

August 2nd visited Mr. Sudarso, Director of the Technical Directorate and Mr. Munawir, Manager of the Tajum Pilot Center, at the Indonesian Ministry of Agriculture for a preliminary discussion to come to basic agreements so as to be ready for the final consultation regarding the results of the evaluation and the extension of the main agreement.

August 4th consulted Mr. Sumantri, Special Advisor, Directorate General of Agricultural, Mr. Raharja, Director of the Extension Directorate Mr. Sudarso, Director of the Technical Directorate at the Indonesian Ministry of Agriculture.

Consultation was based upon the attached material entitled "The Brief Report of the Evaluation Team for the Tajum Pilot Scheme".

2. Some views toward the extension of the agreement for the Tajum Pilot Scheme:

(1) Experts team delegated O. T. C. A. "The Tajum Pilot Scheme" has shown steady achievements in line with the directive set forth by the Joint Committee initiated in Purwokerto, December 1972. However, with the view that the ultimate objective of the "Pilot Center" is a thorough extension throughout the total area under the "Scheme", a 3 to 5 years extension of the agreement is desired upon expiration of the existing agreement. In this way, approximately seven Experts (exceping the field of water control) may be delegated and two extension

centers may be made available in the Tajum Irrigation Project Area (3,200 ha.) which should become the sub-centers of the existing "Pilot Center".

Proposals for policies to strengthen extension organization would be made to the Government of Indonesia. In extending the term of the agreement, efforts should be made to establish the techniques necessary to maintain a diversified management with a stabilized collective cultivation of rice as the foundation and a major extension of the latter.

Contrary to the above view, another strong opinion among Experts team members was found as follows:

Within the "Tajum Pilot" area (220 ha.) we see that through the cooperation of the Japanese all initial objectives of the agreement has been fulfilled. Therefore, from here on, it is princibly up to the Indonesian contingent to carry on the work. There is very little that Japanese Experts can do in terms of work volume by extension of the agreement.

(2) From Mr. Munawir, Manager of the Pilot Center:

"Activities at the "Center" are being carried out in compliance with the decisions of the Joint Committee (December, 1972), and are progressing well for the most part, as seen in the following:

(a) Water control facilities and organization have been completed.

(b) Collective cultivation has been organized to achieve increased production and income.

(c) Although extension activities may seem to be achieving little, this is considered due to the social factors involved the limited land ownership. This is outside the technical aspects of the cooperation. In addition the guidance by the "Center" in this area is limited.

(d) Some machinery is not usable, especially tractors and other machines planned for this production work (including hand tractors, etc.). These are inappropriate. Small rice mills are however being used. Training for the operation of machines has been completed. Yet, the fact remains many of the machines designated have little adaptability to the local farming situations.

(e) In conclusion, then, I think Japanese cooperation toward solving technical problems regarding the local activities in the 220 ha. area has served its purpose.

From here on, the project should be extended to the scale of Desa and this can be aptly done by the Indonesian contingent.

(f) After the agreement expires, Tajum Pilot Center will be the "Research & Experimental Station for the Water-management of Central Java Province".

Therefore, we hope to acquire a research worker such as a Japanese specialist to be responsible for water management, preparation, materials and other equipment (including teaching materials for extension work necessary for his work).

(3) From the Ministry of Agriculture, Republic of Indonesia (mainly from Mr. Sudarso, Director, Technical Directorate):

Although the commencement of the actual cooperative activities based upon the existing agreement was delayed, cooperative activities within the 220 has, Tajum Pilot area have now been completed. However, the ultimate objective of the "Pilot Scheme" is to extend it to include an area of 3,200 ha. (Tajum Irrigation Project). The final goal is, then, to extend the actual working area accordingly.

(a) While the joint cultivation of rice was successful, it is necessary, from here on, to study the "multi-cropping" system including dry field-cropping.

(b) Although the pilot center was considered, in the beginning, as the extension center, it will hereafter become the local experimental station since the former operates a competitive function. The next step is to provide demonstration farms of 1 to 10 ha. in various locations so that the technique of water utilization and cultivation will spread to the surrounding areas.

(c) For the above mentioned operation we need the following Experts from Japan:

* Specialist in agricultural economy (study on irrigation cost)
* Specialist in water-management (adviser to experimental station)

* Specialist on cultivation of dry field crops (study on multi-cropping)

(d) Extension work will be studied so that it will be joined with the BIMAS and centered around "Dharma-Tirta".

(4) Evaluation team:

At the time of the survey, (August, 1973) and within the 220 ha. Tajum Pilot Area, the completion of facilities, systemized water-management techniques, materials and equipment supplying, collective cultivation techniques, introductions of extension organizations, and organization of farmers can all be evaluated as achievements of the objectives as stipulated in the agreement as pointed out by Japanese and Indonesian Experts of the "Pilot Center".

Without doubt, the evaluation of the "Tajum Pilot Scheme" itself (in the scope of 3,200 ha. Tajum Irrigation Project) reveals a situation where the extended results can be seen in the surrounding areas and planned results are being achieved throughout the 3,200 ha. area.

Indonesian Experts as well as Japanese Experts have worked diligently in the technical pursuit of the goal to acquire the technical level and to consolidate organizations within the 220 ha. area so that these achievements will be the foundation to spreading these improvements to the entire area of 3,200 ha.

These achievement which have already been accomplished or will have been accomplished by February, 1974, will be evaluated, in light of the agreement, as results of the "Tajum Pilot Scheme" (220 ha.) as provided in that agreement.

The accomplishments to this time are that the basic standards, have been set and the organization to adapt them to the operation, has been completed in all fields of assignments, (with the exception, of course, of some minor items requiring one or two supplements).

Therefore, we maintain the view that the initial objective of the "Tajum Pilot Scheme" (220 ha.) has been fulfilled because of the setting of these standards and the completion of the basic organization.

However, this does not mean that the final objective has been fully achieved in the "Tajum Pilot Scheme". Yet there is no more technical

activity to cooperate on. It goes without saying that further accumulation of knowhow and repetitious training should be planned under appropriate cooperation between Indonesia and Japan in order to have the presently acquired technical level assimilate and fixed in the local farming communities.

The foregoing statement is an agreement reached through several discussions held among visiting specialists, Indonesian staff members and the Evaluation Team members. Based upon mutual understanding. The "Brief Report of the Evaluation Team for the Tajum Pilot Scheme" was prepared to indicate the actual circumstances of the Tajum Pilot Scheme and plans for its future direction.

Addendum: 4th, August 1973

The Brief Report of Evaluation Team for Tajum Pilot Scheme

1. General View

Both the Indonesian and the Japanese Tajum expert teams are convinced that the initial target for the Tajum Pilot Scheme has been almost attained or will have been achieved by February 1974.

We, the Evaluation Team express our assent to this view.

2. Exposition by Specialities

a) Irrigation facilities

All the irrigation facilities of such extent as they do not give a hindrance to the present farming activities, was brought to completion.

A start was made to provide the farmers with the trainings on maintenance and repair of the facilities by use of the established standards.

b) Water management

Measurement were made on water requirement, canal loss and etc. for the Tajum Pilot area of 220 ha., after determining the method in computing them.

It was made possible to follow the other area by the use of the determined method.

Trainings have been provided to the leaders responsible for the management of water as Dharma Tirta had been brought into existence.

c) Farm machinery

There are machineries enough in quantity and kind in the Pilot center to be used for the present farming works and the training on the mechanized farming for the future.

Trainings were given on their operation and repair.

d) Rice cultivation

The joint cultivation system are now in practice for the improvement of rice cultivation. The system introduced in the Tajum Pilot area is aimed at introduction of improved variety, joint nursery bed making, establishment of cultivation standard on the basis of the BIMAS standard and unification of a period of each farming work in accordance with the standard.

Among which, the introduction of improved variety and joint nursery bed making are practiced by most of the farmers in the Pilot area, and fertilization and pest and disease control, by some part of them.

Thus the way has been paved for full implementation of the joint cultivation system.

e) Farmers' association and extension

The farmers' association was successfully put into existence and now the center-trained key-farmers come into operation.

3. Future Course

The activities for the Pilot Center to follow even after February 1974 are considered to be as follows.

a) To make continuous efforts to perfect the joint cultivation technique such as introduction of improved variety, joint nursery bed making and unification of a period of each farming work in accordance with the standard, and to enrich the extension activity in the content.

Here there is a need to adjust the various Indonesian organizations concerned with extension for the better coordination among them.

b) To make the already established technique to take root among the farmers by giving well planned comprehecive trainings over and over again through the organization formed in a village as its one unit, in the area of two villages including the Pilot Scheme area.

c) To draw up the standards for multiple cropping technique centered on rice cultivation (guidance on the secondary crops to be introduced for a period of 70 to 90 days left between rice cultivations), water saved cultivation aiming at highly advanced use of water and the machinery utilization well combined with animal power suited for the locality.

d) To make clearer the concrete status and contents of the Experimental Station proposed by Indonesia as the future plan.

4. Scope of the Japanese Technical Cooperation

The technical cooperation to be extended by the Government of Japan is considered in its contents as follows, if the Japanese cooperation period were prolonged by another two years of less, after its expiry on February 1974.

a) Instruments and materials

(1) Instruments and materials necessary for training and extension activities.

(2) Instruments and materials needed to conduct survey of soil, measurement of water and meterorological observation.

(3) Spare parts for the equipments and machineries granted by the government of Japan.

b) Japanese experts (assignment and number)

(1) Expert on cultivation on rice 1

- Guidance on the joint cultivation, advice on its extension and training.
- Guidance on drawing up a standard of secondary crops.
- Guidance on drawing up a standard of water saved cultivation.
- Guidance on drawing up a standard of soil survey.

(2) Expert on rice-centered farming program 1

- Advice to Dharma Tirta on its farming activities.
- Guidance on drawing up a standard of machinery utilization well combined with animal power.
- Formulation of survey and analysis method of farmers economy and its case study.

(3) Liaison officer 1

- Preparation of the teaching materials for training and extension activities and advice on them.
- Procurement of the instruments and materials to be granted.
- Contact and liaison to the organizations concerned with the Scheme.

Note: 1) The long term experts are considered to be ones mentioned above and about three in number.

2) The team leader will be nominated from amongst the above Japanese experts.

3) A short term expert is considered sufficient for a field of water management.

c) Provision of domestic trainings for the Indonesian officials concerned.

5. Necessary measures for the Government of Indonesia to be requested to requested to take.

a) The Government of Indonesia is asked to make best use of the achievements obtained so far through repeated trainings which will form a nucleus

of the center activities. In this regard, the Government is requested to take necessary measures to provide budget and personnels enough to implement them.

b) The Government is also requested to make further efforts to coordinate the existing extension system and the Pilot Scheme to bring the an said achievements obtained in the scheme into fully play.

IV. Detailed Statements

IV-1 Irrigation and Water Management

1. Purpose of Irrigation Assistance

In the five year Indonesian Development Plan (REPELITA-I), agricultural development by utilization of irrigation facilities was highly thought of. Because of this, the Tajum Irrigation Project was brought into being. Not only were main structures and basic facilities constructed but the necessity for a pilot project to strengthen relationships with the farmers, (the main feature of agricultural development,) and to upgrade their abilities came under discussion. Emphasis was placed on irrigation and guidance in the arrangement of a soil base after construction of basic facilities and attainment of a reasonable level of operation of these facilities. Consequently, it might be stated that the aim of this Pilot Scheme is to establish a basic propulsive system of agricultural development by uniting the two poles of the irrigation department and the farming department into one body at the farmers' level.

Accordingly the following three items are listed as aims in the field of irrigation.

(1) To establish an irrigation system of high efficiency, particularly effective in the dry season.

(2) To allot water faily and reasonably.

(3) To establish a water control organization conducted by the farmers themselves.

Since irrigation facilities require an enormous investment, the utilization of these facilities must be fair and reasonable under differing conditions of water resources and water demands. The maintenance and management of facllities are also important to bring these facilities into full play. Additionally, collection of the water charge is considered necessary for the utilization of these modern facilities. However, collection of a water fee is a policy of the government in this project since no example of a large scale project of this sort has yet been carried into effect in Java.

2. Construction of Basic Facilities and Related Items

The construction of basic irrigation facilities such as one head work, a main canal of 25km, tunnels, aqueducts, siphons, etc., was started in 1965 and completed in February 1973 as a public utility enterprise conducted by the government. Before the completion of construction, since about a half of the upper stream of the main canal could be used as a water passage, dry season croping was conducted. However, the greater part of this irrigation canal is a soil water channel constructed mainly by cutting and embanking and several times partial breakdowns were repaired and reinforced by lining and the like. The water passage was substantially completed in December 1972.

Contrary to the construction of the basic facilities, construction of the attendant end network of the irrigation canal was specified as an enterprise to be conducted by the farmers themselves. In central Java, an organization generally called Dharma Tirta, is conducting the construction of the end network of the irrigation canal which has been in progress longer than expected. About 80 percent of the end network of the irrigation canal had been completed by May, 1973. Outside the area of Tajum Pilot Scheme and its dry season croping, croping started one year later. At present, however, the canal is not sufficiently finished so that defects can be corrected by maintenance and repair. Construction work is done with simple materials by group work of the farmers themselves, and some years will be required before the farmers organization, Dharma Tirta, will be able to perform autonomous management in the entire area of 3,200 ha. As to the construction of the water channel network and assistance in water control, it is necessary to arrange a broad guiding system based on the establishment of a "standard".

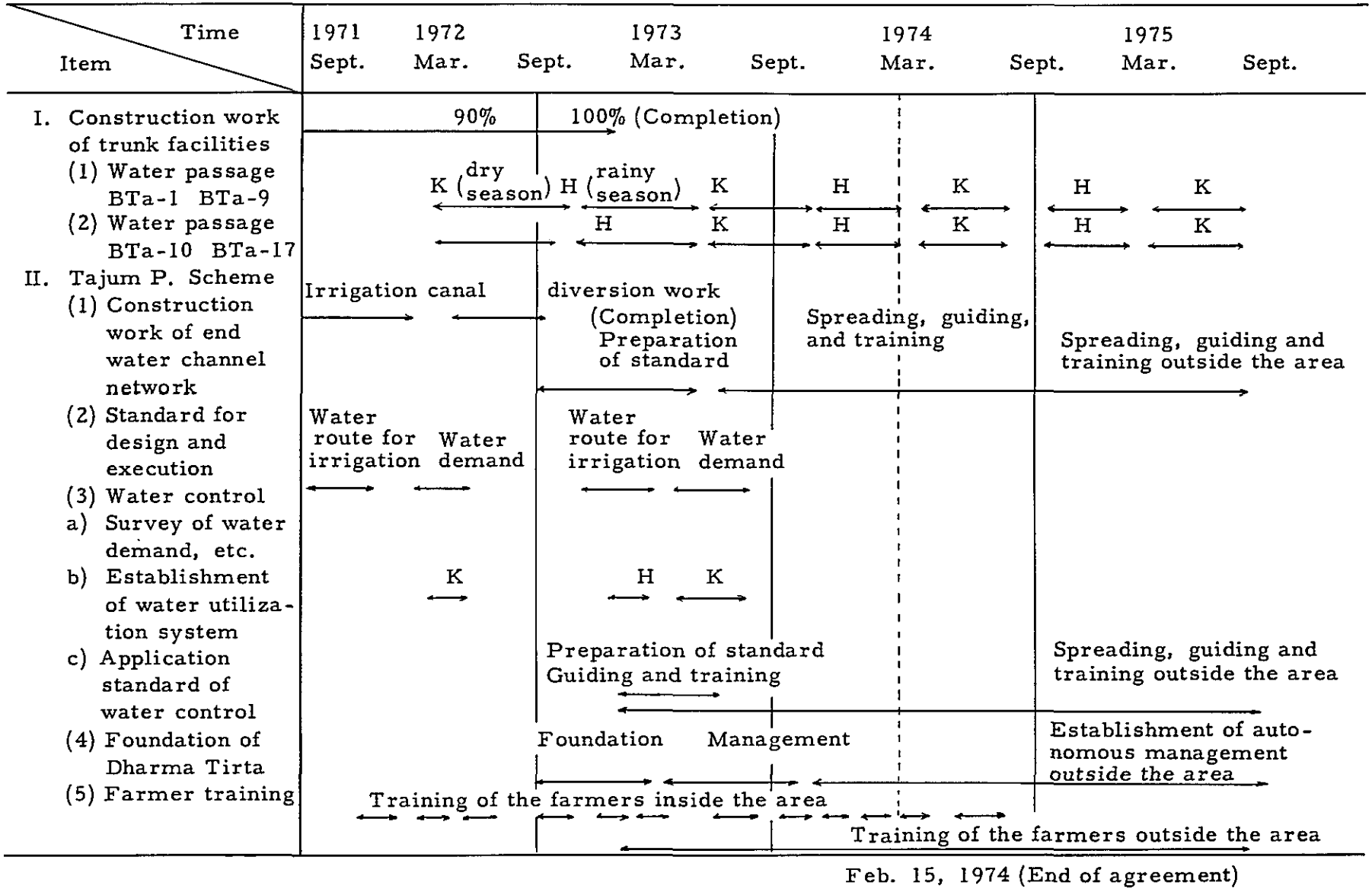
The above stated problems are graphically represented in Table 1.

3. Execution of Irrigation Instruction

(1) Survey of Present Conditions

A. Measurement: Detailed measurements of geographical features

Table 1. Table Showing the Relation between Construction Work and Instruction to the Farmers



and water route were carried out in order to arrange end water channel network and farm roads.

B. Water route for irrigation: Because of pouring irrigation method, irrigation blocs were determined by on-the-spot measurement. According to the results, the positions and numbers of intake were reviewed and revised.

C. Water demand: Rainfall, reduction of water depth, amount of evaporation were researched. Since the research requires observation over a long period, the survey will be continued as long as possible.

Number of days and water demand for harrowing: Since the number of days and water demand for harrowing affect the peak water demand, they are the important factors in determining the operation of water control and the dimensions of the cross section of the water channel. Particularly as to water passage in the dry season, it is necessary to cope with increase of water demand due to dry cracking.

D. Irrigation water loss: Irrigation water loss, which excludes losses in the basic facilities and is equal to water channel loss, was estimated in the plan as 20 percent. Water control to reduce these losses was required, and its measures were examined on the spot along with the measurements of losses. The method of water control depending on income and expenditure of water was also investigated.

E. Examination of the components of facilities: As to the basic facilities, since a running test was carried out twice at the Tajum irrigation office, the components of facilities such as head works, water channels and diversion work gates were examined and their operation systems examined during the test.

Romein gates for diversion to the tertiary canal, diversion works and intakes regulate the water control operation at the ends of the network so that the examination must be continued in future in paralleled with the preparation of the operation standard.

(2) Plan

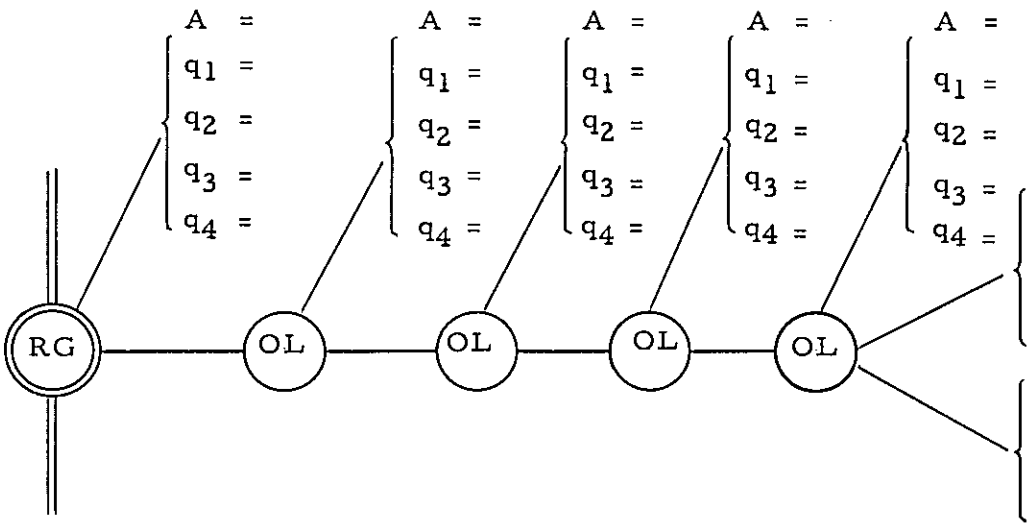
A. Design of the irrigation canal: The arrangement of the tertiary canals was based on the results of measurement, followed by design of incline, cross section of, and attendant structures of water channel, and designs of diversion works and intakes. The basic conditions of design were that the irrigation is done by the pouring method, that the system has to be popularized in the peripheral area by self-aiding efforts of the farmers themselves, and that water control will be performed sufficiently by the farmers organization of Dharma Tirta.

B. Design of farm roads: Concerning to the arrangement of farm roads, the existing trunk farm roads were considered to be so useful that they were repaired mainly for the purpose of sending-in agricultural machinery. Those corresponding to cultivation roads have, however, not been introduced yet. Consequently it is not possible to send machinery into all fields. The arrangement of fields on the premise of sending-in machinery is a future plan which will be investigated along with the general life improvement of the farmers. At the present stage, it is planned to send the machinery in experimentally by means of gravelling to maintain the roads for the time being.

C. Water allocation plan: Some types of water allocation plans can be considered depending on the yearly changes of planting systems, effective rainfall, available amount of water for facilities and unit irrigation water demand. In this case, how to perform planting in the dry season is a particularly important problem; the ultimate aim of the plan is how effectively to utilize the limited amount of water. Additionally, the water allocation plan must be simple and rational, because it is scheduled to become the water control method conducted by the farmers organization. Keeping these points in mind, the following three methods were considered. It was decided to use (a) as the first stage and finally establish plan (b) or (c).

(a) The operations of R. G. (Romein Gate) and O. L. (Out-Let) are simultaneously conducted in four steps.

(b) The four irrigation blocs are divided into two groups (T_1 T_3 = 109.4ha/T_4 F_6 = 97.1ha) and planting periods are delayed by 15 days by planting regulation. The operations of R. G. and O. L. are similar to those of (a). This method will be applicable only when an appreciable amount of effective rainfall can be expected or the necessary amount of water for harrowing can be reduced. It is therefore dangerous to put into practice disregarding these conditions.



(c) In one irrigation bloc, the planting period is delayed for each O. L. (delaying days vary depnding on the area), the operation of which is conducted in four steps. The operation of R. G. is conducted in a manner corresponding to that of O. L. This method requires a high level control system because the operation of O. L. is conducted so that a definite amount of water is to be set for each number of days.

(d) When more than one croping per year is expected, in what month the peak of water demand in harrowing period should be scheduled comes into question. Since it is difficult to make the harrowing period agree with the large effective

rainfall period, the design of the cross-sectional dimension of the water channel must be based on the peak harrowing period.

On the other hand, an effective rainfall of 150 180mm per month can ordinarily expected in a usual irrigation period except for the harrowing period in the rainy season so that a water amount below one half of the cross section of the water channel is sufficient. Accordingly a plan for drainage of excess water is necessary and an operation is required to prevent the introduction of an excessive amount of water. Moreover, because of an abundant amount of water, simplification of water control operation is also possible. Based on the above mentioned points, method (a) was basically adopted.

(e) Since the water utilization program of Tajum project was based on a water famine period which will probably occur once in ten years, it may be regarded a sound plan. However, the allocation standard was determined as a countermeasure to an abnormal water famine; that is fundamentally based on (b) and (c) with rotation system.

D. Irrigation water reduction plan: The aim of the plan was to reduce the amount of water utilization as much as possible by means of cultivation using less water than theoretically required, or careful use of water control for each growing period of paddies within a small irrigation bloc (6 10ha) was selected because of its clear water route for irrigation and easy water control operation, with the principal that the yield would not be reduced. The water control method of rotation is the same as (e).

This reduction plan is an on-the-spot experiment and hence data obtained are not applicable to the peripheral area. Technical observation over a long period and precise technical examination is required.

E. Preparation of execution standard: The construction of most end irrigation facilities was managed by the national outlay, therefore the execution of the work had to be the model for the

whole Tajum irrigation area of 3, 200ha and also be performed in such a way that techniques could rapidly be introduced into the peripheral area. These techniques were, not necessarily to be of a high level but rather to be standardized to a level which could be easily understood by technicians on the scene.

(a) Design and execution standards

Because of small scale structures, their abundant number, simple materials and economy of construction costs, both of design and execution were slight. Standardization will make design and execution uniform and also make execution in a broad area simple. Because of simplified structure, maintenance and repair are also very important and will be put into practice at the same time.

(b) Performance standard of water control

The water allocation formula and operation method will be established and standardized.

F. Farmer Training Plan: The irrigation instruction to the farmers places emphasis on the guidance to Dharma Tirta organized with the farmers. Lectures will feature expansion of general knowledge and a substantial introduction of practical training. The training plan is divided into two phases which include the following.

(a) For the farmers in the pilot project area of 220ha, training will be conducted aiming at the establishment of (a), (d) and (e) of the water allocation plan; instruction of high intensity will be conducted to establish a water control system of a high level in a short term with the hope of completing the model for the peripheral area at an early data.

(b) The phase two plan

For the farmers in the whole area of 3, 200ha of Tajum irrigation project outside the pilot project area, training will be conducted with intent to complete the establishment of Dharma Tirta, to execute smoothly the construction of a water works channel network and to establish (a) or (b), (c) (d), and (e) of the water allocation plan. Because of the

broad range of the objective area, it will be impossible to conduct instruction of high intensity, but a scheme must be established to bring about an environment in which the self-improving effort of the farmers will be promoted and encouraged.

(3) Execution

A. Construction of water channel network and farm roads

Expenditures for these construction works should essentially be financed by charging the farmers, nonetheless all of those in the pilot project area were covered by the national expenditure, and consequently the work executed by contract.

B. Maintenance and control

The maintenance and control of water channel and farm roads shall be conducted by Dharma Tirta, a farmers organization. In actual management, however, the pilot center will execute the management for the time being. To make autonomous management by the farmers possible, repeated instruction through the plan for training of the farmers will be carried out. Detailed managing rules for the Dharma Tirta have already been established.

C. Farmer training

Training of the farmers is now being put into practice to satisfy the requirements of the two targents of technical training, to provide the farmers of the new agriculture scheme with irrigation, and organization training to promote the establishment and management of Dharma Tirta. Particularly, practical training such as field trips for the farmers to study Dharma Tirta practiced already in other areas of central Java.

D. Guidance outside the area

Guidance and advice will be given to popularize the results of the pilot project into the irrigation area of 3,200ha outside the pilot project area. Guidance of high intensity the same as that conducted in the pilot project area is, however, impossible

because of the broad range of the object area. Training is limited to the representative of the farmers, and officers and leaders of Dharma Tirta. The full-scale execution of the second phase plan for farmer training will be a problem for the future. The preparation of a execution standard will be exceedingly important for this instruction.

Concerning the above mentioned (1) Survey on present conditions, (2) Plan, and (3) Execution, the executing conditions of each item are listed in Table 2.

4. Results Obtained To-Date

(1) Construction section:

Construction of the water channel network was completed at the end of March, 1972. An irrigation system capable of providing irrigation water to the whole area of 200ha was accomplished by providing temporary facilities made of bamboo, etc. The construction of diversion works and intakes was put off until the second phase of construction. The farmers in the area consequently, made the first dry season croping with irrigation water during the four months from May to August.

The second phase of construction was completed at the end of December of the same year, whereby the final aim of peripheral arrangement in the field of construction was accomplished. Conditions necessary to make reasonable water control possible were also provided. On the other hand, as to the arrangement of the road network, because it was to be accomplished corresponding to the rate of introduction of agricultural machinery, and because the requirements of the farmers and the prospects far introduction in future were not clear at the current stage, the establishment of new roads was avoided as much as possible and the existing farm roads were repaired.

The above-mentioned results in the field of construction in the pilot area were a good influence on the peripheral arrangements in the outlying area conducted for one full year, therefore, its role

Table 2 Executing Conditions for Each Item

Item \ Time	1972 Sept.	1972 Mar.	1973 The present time Sept.	1973 Mar.	1974 End of agreement Sept.	1974 Mar.	1975 Sept.	1975 Mar.
1. Survey of present conditions								
A Measurement						(Outside area survey)		
B Water route for irrigation								
C Water demand								
D Number of days and water demand for harrowing								
E Irrigation water loss								
F Components of facilities								
2. Plan								
A Design of irrigation canal and other items								
B Design of farm roads								
C Water allocation plan								
D Plan to reduce irrigation water								
E Preparation of execution standard								
F Farmer training plan								
3. Execution								
A Construction of water channel and farm road								
B Maintenance and control								
C Farmer training								
D Guidance outside the area								

as a model was accomplished. Moreover, standards for maintenance and repair of facilites were set up, and are now being put to practical use for farmer training.

(2) Water control section

By observation of unit water demand, or water channel loss; and of amount of flowing water, or rainfall, the actual conditions of water utilization became clear. The amount of water diversion was also examined. As a result, it was confirmed that all dimensions of the water utilization plan were within satisfactory limits.

In addition, farming guidance such as establishment of a common nursery with a unit of Kompok, simultaneous cultivation, etc., produced remarkable results. Guidance on water control was effectively carried out through Dharma Tirta, a farmers organization. Instructions on water control carried out until the present time were established as water control rules or water operation rules which have become guidelines for the training of farmers. This training continue to be conducted in the future. (See attached water control rule.)

These standards are mainly based on the allocating operations of water demand which is planned against a water famine with a probability of one-tenth. Therefore these standards provide the basic guidelines for water control in cases of both water abundance and water famine.

Dharma Tirta, a farmers organization chiefly concerned with water control, was established in October, 1972, in accordance with the technical guidance of the center.

5. Evaluation of Each Item

The following evaluation of each item were carried out in order to understand the results of the execution of the pilot plan.

(1) Water operation and water allocation system of each tertiary.

It is difficult to say if all items specified in the water control regulation are being properly conducted. However, the operation has nearly reached a stage where no substantial defect exists.

Further training of Dharma Tirta's leader at the technical level concerning irrigation is however, still necessary since inadequate management procedures are being followed at the present time. It is required that the training of the farmers is completed to resolve these problems.

(2) Excess or shortage of water demand

There is a certain margin between the maximum water demand in the plan (q_1 = 1.67 ℓ/sec.-ha) and the actual water demand. Moreover, as the water demand in the normal irrigation period (q_2 = 1.16 ℓ/sec.-ha, q_3 = 0.87 ℓ/sec.-ha), no shortage of water demand can be considered under the normal water control specified in the water control regulation.

(3) Area capable of being supplied with water

Because the paddy field with natural rainfall has been changed into an irrigation paddy field with a water channel network, some paddy fields of small area which must be excluded from the irrigation area are dotted here and there. These are estimated to be 3 - 4ha in all in the pilot area. In addition to this, there are some reclaimed paddy fields of 1 - 2ha which were formerly kitchen gardens. Consequently it can be said that up to 97 percents of the pilot area has been changed into the irrigation paddy field system.

(4) Water supply situation

Up to now there have been several complaints from the farmers indicating insufficiently of water supply. The causes of these complaints are, however, a problem of water control, and of the maintenance and repair of the water channel. All problems have been smoothly resolved through further instruction.

(5) Rationalization of irrigation water level

Although irrigation water control by Romein Gate is reliable, fine adjustments corresponding to the change of water level in the trunk water channel are not sufficient. Because of this there are many deviations in water intake from the Romein Gate.

The check of water intake at the Out-let is not accurate owing to its structure, however it can be utilized.

(6) Maintenance and repair of the water channel

The elimination of piled up soil and levee repair work to prevent water leakage from the water canal must be perfectly performed. Especially since there are many complaints from the downstream district, it is necessary to make the work conducted by Dharma Tirta's organization of good quality. The situation after the first year of construction is by no means sufficient, however, from the beginning of the second year work such as weeding are being carried out as a means of the static situation.

(7) Dharma Tirta management circumstances

Actions such as damaging the water channel on purpose or by cattle and actions such as water intake being interferred with, are strictly prohibited under the regulations of the Dharma Tirta, and these regulations have been obeyed up to the present. Dharma Tirta is also conducting activities such as the procurement of weir board and other necessary materials for water control. Execution of the water utilization plan is generally good, and it can be judged that the farming system required for water utilization such as regulation of the nursery period has been established by Dharma Tirta which is taking a leading part in the project. There are many unsolved problems remaining in the operation of Out-let.

6. Future Plans

A. The guidances for Dhama Tirta, a farmers organization, centered on water control and the training of farmers have been put into practice by making the maintenance and repair of the water channel and the execution of the water control regulation basic principles. These guidelines and training must be conducted repeatedly in the future.

In particular, guidance and advice to the area outside of pilot project area were given only once to the leaders and the key farmers. This can not be regarded as sufficient and it is important to continue guidance and training. For this purpose, establishing irrigation facilities and water control techniques, and regional expansion are considered to be the chief aims.

Training based on the composition of additional curriculum is required for this purpose.

B. As to the data necessary for water control such as unit water demand, irrigation water loss, rainfall and other weather data, it is desirable to continue the observation in the future.

C. The Irrigation Committee, established to make a smooth execution of the duties of four members of the Agricultural Extension Service, Irrigation Service and Village Administration which are the local government organization, and Dharma Tirta, a farmers organization, has not begun substantial activity on the scale of the whole area of 3,200ha. The final target of water control is that the regular system can be assumed to be established only when the whole irrigation area goes into operation. Hence the importance of the Irrigation Committee will soon become apparent. It is important that the pilot project grasp the actual situation of the peripheral area to be able to give effective guidance and advice.

D. From the viewpoint of violently changing weather condition in the tract of Java State of Central Indonesia and the demand for agricultural irrigation water, an effective operation of water utilization system corresponding to the changes in cultivating technique with reduced amount of water and a production technique such as the introduction of machinery, and a water control system related to the alternation, etc. of the water utilization plan due to simultaneous paddy planting become apparent.

The necessity for this plan corresponds to the popularization of its cultivating technique. Its constant application on-the-spot must be carried on in the future. Consequently, it may prove useful as a part of the Experimental Station Plan as a future concept of the Tajum Pilot Center. However, at the present time, this plan will not become an immediate objective of the training program.

IV-2. Agricultural Extension

1. The Concept of Extension Activities in the Initial Plan

According to the Designing Report for the published in April 1971, this project was popularly termed the Tajum Pilot Scheme and was intended to carry out the following activities:

1) Design and construction of pervasive irrigation, drainage and farm road facilities;
2) Technical assistance in effective water control;
3) Dissemination of advanced farming techniques and improved techniques;
4) Guidance and training of Indonesian government officials and key farmers;
5) Guidance of farmers' organizations.

It was also reported that to promote these objectives, centers would be set up which could continue to be used for regional extensions after the expiration of the technical assistance period.

With respect to these basic concepts, this survey report on agricultural extensions deals chiefly with (3) and (4) and in the sense of establishing farming technology dissemination organizations, (5) is dealt with in part.

In the previous report, the concepts of extension activities were separated into 3-year agreement periods as summarized in Table 1. The improvement objectives within the pilot area were:

(1) Cultivation of a double crop of paddy rice through irrigation;
(2) Increased rice yield (10 t/ha/year) by use of fertilizers and agricultural chemicals.

To achieve these objectives it was proposed to upgrade farming guidance to set up agronomic standards and introduce farm machinery. Farming guidance would take the form of unifying the extension guidance systems at the regency (kabupaten) and sub-regency (kecamatan) levels and key farmers, selected from the farming organization level (kelompok)

would further provide direct guidance and training to several local farmers.

Consequently, in the initial expansion plan, the concept aimed at establishing farming organizations for technical dissemination in pilot areas (220 ha) and achieving objectives while reinforcing the existing guidance systems. A future objective was the completion of the entire Tajum irrigation district (3, 200 ha) as a pilot project.

2. Present State of Agricultural Improvement and Extension Services and the Extension Guidance System around Tajum.

(1) Orientation of Indonesian Administrative Organizations and Extension Services

The administration of agriculture in Indonesia is the responsibility of the Ministry of Agriculture, while extension activites come under the Directorate General of Agriculture and the BIMAS Secretariat. The BIMAS Secretariat was set up independently by Indoensia and is an office for the promotion of the BIMAS Program and is responsible for the financial system for farming capital and funds for fertilizer and agricultural chemical purchases, as well as expenditures for display facilities to disseminate agronomic standards for paddy cultivation. Consequently, when considering extension services regarding rice-crop improvement, the extension of the BIMAS Program cannot be disregarded.

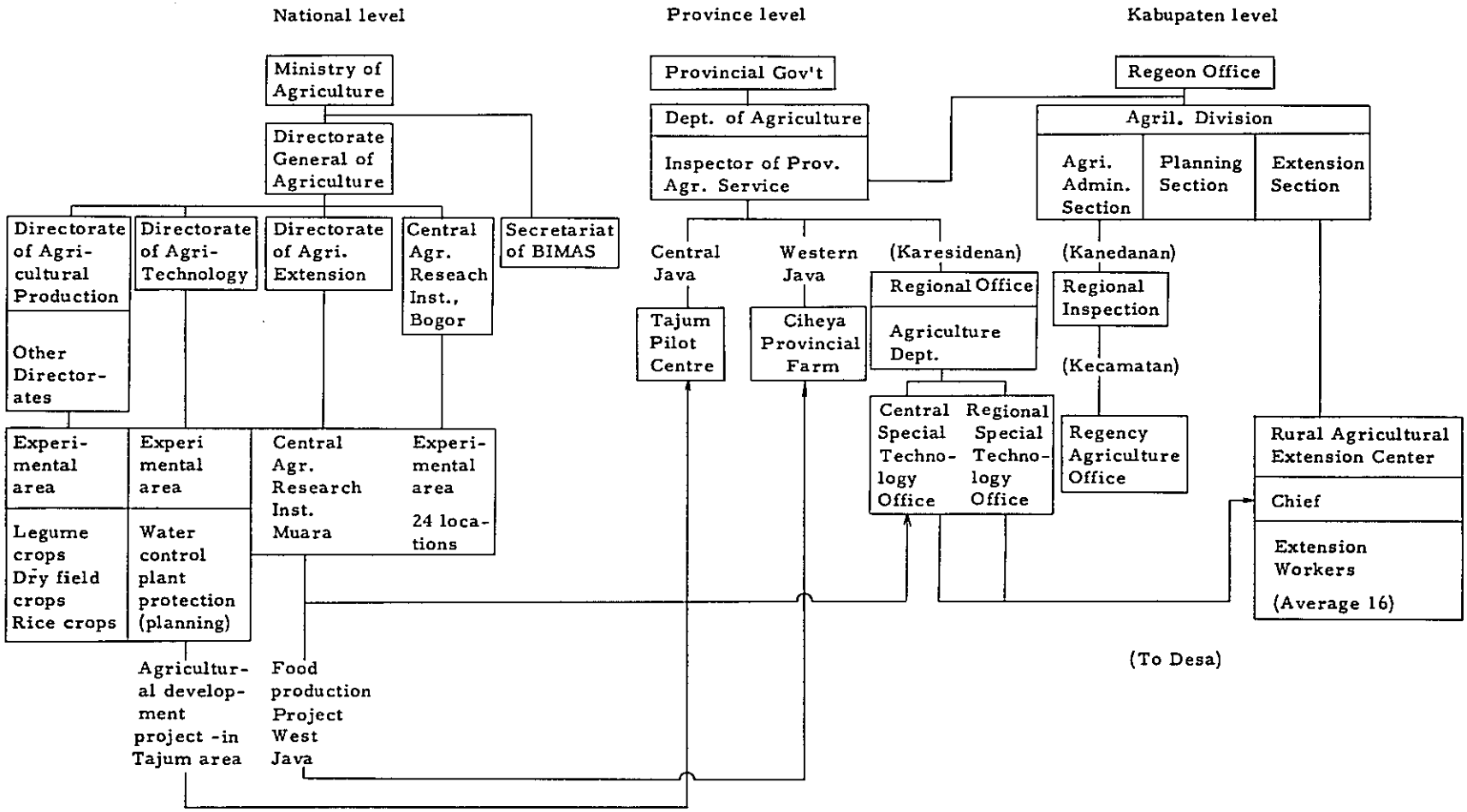
The office with direct responsibility for extension services is the Directorate of Extension Service under the Directorate General of Agriculture. Personnel actually engaged in expanding extension services (technical specialists and extension workers) are stationed in the provinces (propinsi) and regencies (kabupaten). Each provincial government has a Provincial Agricultural Service staffed with inspectors. These inspectors are also responsible for extension services in the province. Within a province there are also regional units, known as keresidenan (residencies) covering 3-4 regencies, which include agricultural divisions. Several technical specialists

Table 1. Pilot Farm 3-Year Plan

Item \ Year	1st Year	2nd Year	3rd Year
Cultivation techniques	Demonstration of double-cropping techniques Demonstrations of fertilization methods, timing and amounts Study of dry season water use and yield Crop protection work Introduction of intermediate crop to crop rotation Production and yield studies	Same as 1st year except that based on results in the 1st year, a study of improvements to be instituted will be made.	Standardization of double-cropping techniques Introduction of other crops supplementing wet & dry rice Est. of water control techniques
Establishment of farmers organizations and cooperative		Strengthening of organizations	Est. of organizations
(Joint Agricultural Cooperatives)	Peripheral Farm M'gmt. Organizations Selection of water controllers Establishment of cooperatives articles and holding general meeting Regulation of block irrigation system Study of previous year farm income Others	Invitation of key farmers and establishment of general office for communication councils of Tinggarjaya & Banter Joint village meeting Study of accounts General meeting of cooperatives	Comparison of income & expenditures before double-cropping and previous year Study of repayment for water use & materials

Item \ Year	1st Year	2nd Year	3rd Year
Extension services	Strengthening of extension through cooperatives Farmer orientation Slide film shows Lectures Practice with machinery Recreation Others	Regular communication & discussion meetings, collection and dissemination of data Farm study meetings Farm consultation office Others	Establishment of extension system Analysis of previous year's performance and improvements in extension system
Mechanization	Introduction & training in machine work Use of autocultivator Use of auto-sprayer for insect control Trailer transport Harvest with grain-sickel Treshing with treadle-tresher Rice-cleaning at center Mechanization of other operations	Improving farm efficiency System for exchange and use of agricultural machinery between organizations and maintaince system (not to be moved from area involved)	Establishment of machinery use techniques As I asked of, cooperative services, system for requesting certain works of machine services and system of rational machine use

Fig. 1 Agricultural Administartion and Extension Organization In Indonesia



are assigned to these units. These technical specialists may be officials of the national or provincial governments, but in either case they form a team assigned to the provincial government's Regional Directorate. They also supervise the extension workers at the provincial level. Also directly under the Directorate of Agricultural Extension is the Central Agricultural Training Institute at Muara in Bogor Province. It is chiefly involved in the training of these technical specialists. The nearby Central Agricultural Research Institute is engaged in producing data related to guidance activities.

The extension personnel who provide direct assistance to farmers are all provincial workers. Within the provincial agricultural departments, there are offices for extension services. These offices would correspond to an Extension Section in the Japanese administrative organization but in Indonesia they are called Extension Centres. Under the chief of an Extension Centre are several Rural Extension Centres staffed by extension workers. The location of rural extension centres is described in a publication of the Directorate of Agricultural Extension (Conception of Rural Extension Centre - P3 - Pusat Penyulhan Pertanian) as follows:

1) Functions of Rural Extension Centres
   a. Creation of extension plans for farmers, farm-wives and farm youth;
   b. Effective transmission of agricultural information;
   c. Preparation of more profitable agricultural extension services;
   d. Supervision of training to improve farming knowledge and techniques;
   e. Assistance in supplying required farming materials and facilities;
   f. Guidance to farm households to promote a better inter-family welfare system.

2) Location of Rural Extension Centres

The location of Rural Extension Centres will be determined in accordance with the following criteria:

The location will be strategic with respect to the entire region, and advantageous with respect to extension services, accessible by vehicle, and such as to provide an exemplary model for the surrounding farmers.

When these conditions are met, an extension centre, seed centre, field crop experiment station and other facilities of local interest will be selected.

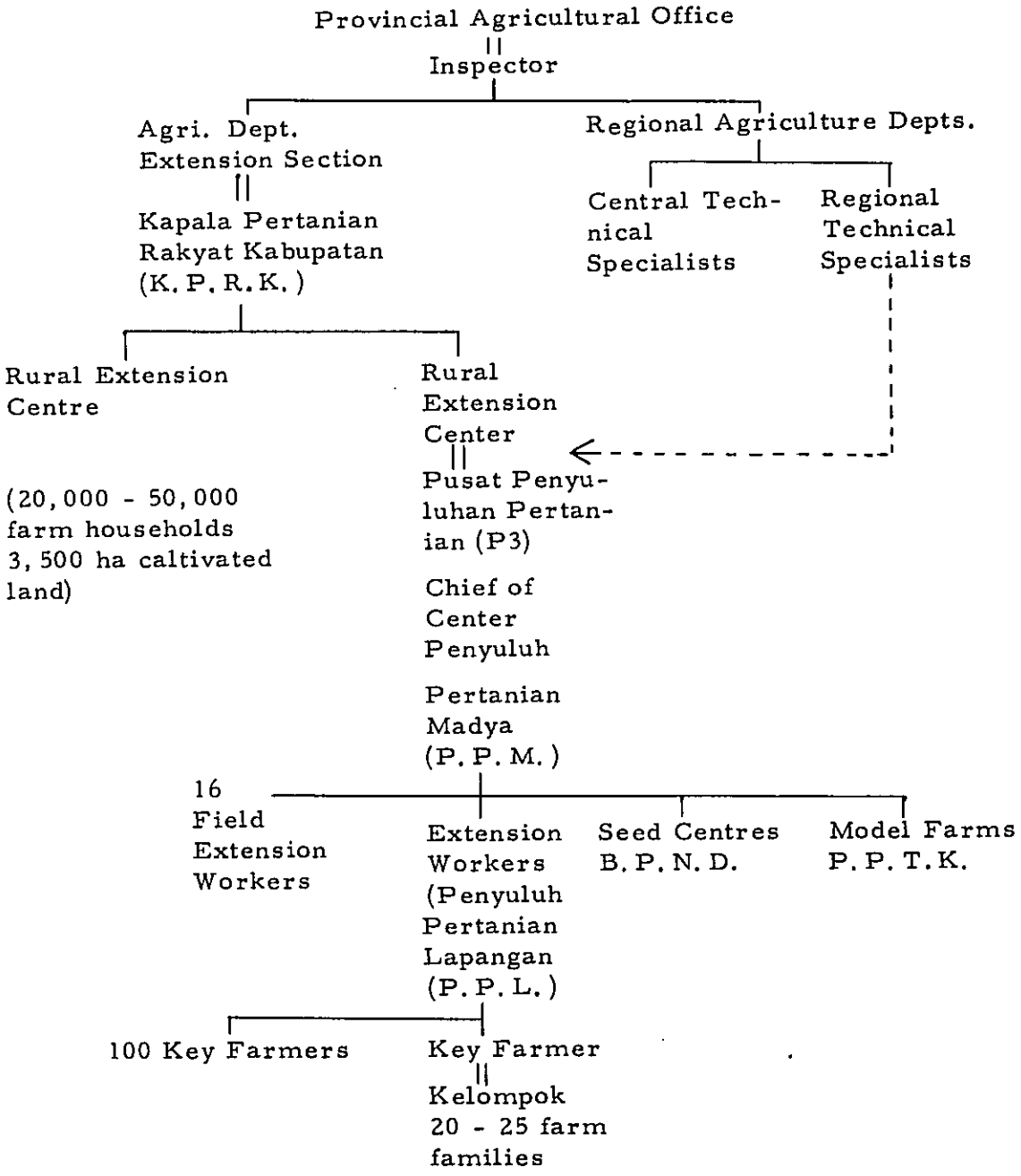
3) Service Area

The area served by an extension centre will be determined by the number of farms with which it can communicate and the size of the farming region. Each extension centre will have a staff of 16 extension workers, covering a farming region of approximately 2500 ha and serving 20,000 - 50,000 farming families. These figures were derived on the assumption that each extension worker would supervise 100 key farmers and one key farmer would extend his influence to 20 - 25 farmers (16 x 100 x 25 = 40,000). Based on data from West Java a target of 2 Rural Extension Centres per province was set. This has been almost fully met. Each Rural Extension Centre has an average of 16 extension workers. Meanwhile in Central Java the situation is slightly different. There is one Rural Extension Centre per regency (kecamatan) with 2 - 3 extension workers attached to it.

There are also extension workers assigned as a sort of regional superintendent for units of several sub-regencies (kewedanaan). Several of these come under the jurisdiction of the central Rural Extension Centre.

The difference between the extension systems in the west and central areas is sometimes that projects to enhance agricultural

Fig. 2 Organization of Ministry of Agriculture's Directorate of Extension

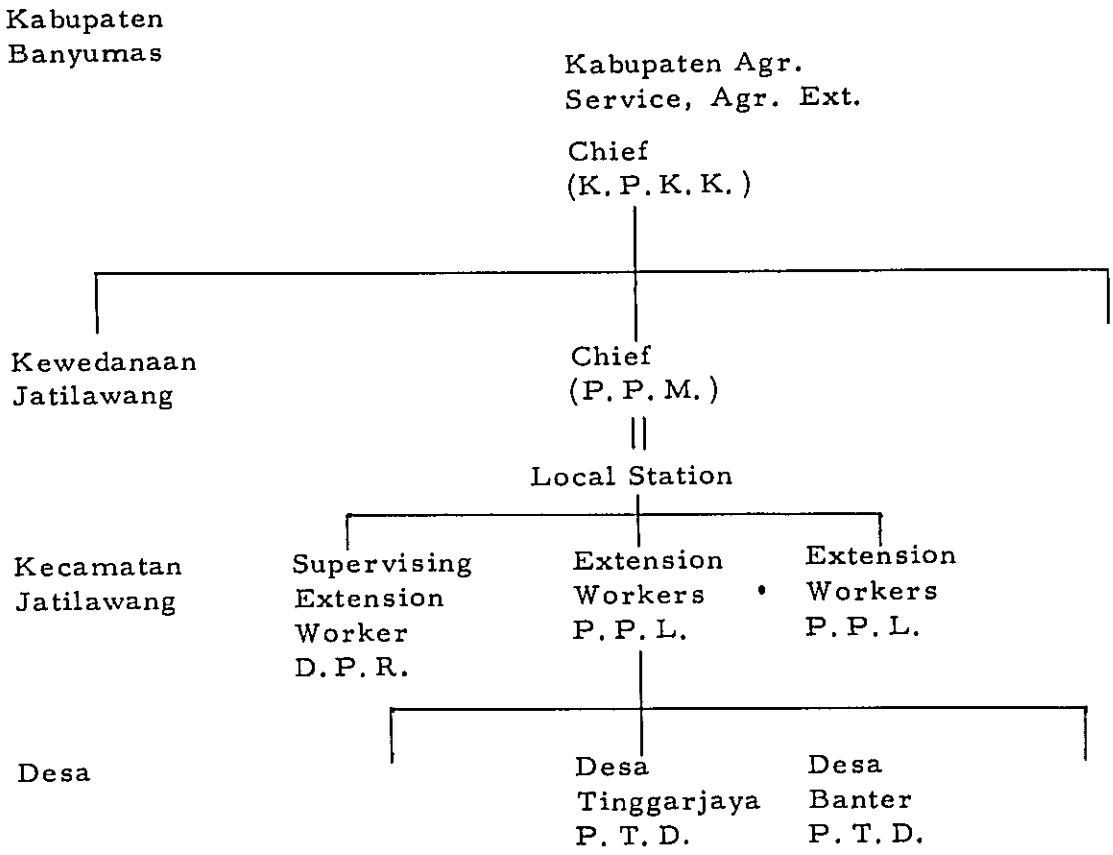


extension services undertaken by the Directorate of Agricultural Extension are implemented in western Java. Originally, perhaps along policy lines of the Director General for Agriculture, all projects involving technical cooperation were divided among the various directorates under him and also implemented in each province. The Directorate of Agricultural Extension was assigned planning for increased foodstuff production and was especially successful in developing the Extension Farm Project in cooperation with western Java Province. This concept is outlined in Fig. 2. Consequently, in general it may be that in central Java the extension system was adopted but because of the results of projects in western Java on the part of the Extension Directorate, this organizational system was promoted throughout the province.

(2) The Extension System in the Tajum Area

Fig. 3 shows the Tajum pilot region and the surrounding extension system. The Tajum pilot region is located in the Jatilawan regency of Banyumas province. In the Banyumas provincial offices at Purwokerto, there is a provincial extension centre headed by a Kepala Pertanian Rakyat Kabupaten (KPRK). There is a Rural Extension Centre in Jatilawang, staffed by three extension workers. There is a Rural Extension Centre in each regency of Banyumas province, with an average of 2.6 extension workers at each. At the Jatilawang Rural Extension Centre, there is stationed a Regional Extension Supervisor (Penyuluh Pertanian Madya - PPM) for the Jatilawang region (Kewedanaan Jatilawang). Under this regional extension supervisor are 13 extension workers who consult once a month on extension services. Each of these workers is assigned a motorbike. Of the three extension workers at Jatilawang, one is designated the DPR (Dinas Pertanian Rakyat) or supervising extension worker and the other two are designated as PPL (Penyuluh Pertanian Lapangan) and also serve as the local promoters of the BIMAS Program. However, according to information obtained from the Agricultural

Fig. 3 Extension Organization for
Area Outside Tajum Pilot Area



Extension Centre, ("Role and tasks of the field extension worker - PPL"), the job of the PPL is described as follows.

1. Role of the field extension worker

   The field extension workers implement the extension plans drawn up by the supervising extension worker. By this implementation is meant implementation with full attention to educational guidance.

2. Task of the field extension worker

   In order to accomplish their tasks, the field extension workers provide guidance to 100 key farmers in their respective areas of jurisdiction. The key farmer is expected to affect a further 20 - 25 farm families. As a result, the field extension worker will provide guidance to 2000 - 2500 farm families.

   (1) Major tasks:

   a. Effective dissemination of agricultural information;
   b. Acquisition and spread of improved farming techniques;
   c. More advantageous publishing of agricultural extension tasks;
   d. Preparation of required agricultural production materials and facilities;
   e. Motivation of the people themselves to desire high-level production.

   (2) Specific steps for performing these tasks:

   a. Preparation of performance plans dealing with time schedules, locations, objects, and methods;
   b. Preparation of daily activities bulletins;
   c. Farmer education by various means -- individual, group education (field days, discussion groups), mass education (meetings, farm village broadcasts);
   d. Displays and presentations;
   e. Development of farm groups into agricultural cooperatives for various purposes;
   f. Application of effective means of communication such as

farm broadcasts (wayang performances), displays, etc.;

g. Recording of tangible and intangible extension achievements, i. e. conditions of key farmers, number of demonstration plots or farms, farming groups and cooperatives;

h. Evaluation of the following types of activities: -- increased extension achievements, effectiveness of methods and procedures used, changes in farmers' attitudes;

i. Improve techniques of extension workers themselves through the following: -- Attendance at training sessions, lectures, discussions within the centre, theoretical meetings, etc. Participation in contents and field days. Attendance at agricultural displays. Reading of books, periodicals and research reports.

j. Reporting to provincial extension chief on extension services.

During a survey in western Java based on this material, it was possible to visit many of the actual sites where extension workers were providing direct education to key farmers. The nature of the extension workers' services were rather different from those in central Java. One extension worker is responsible for four villages (desa) and direct training of key farmers was very limited. Most training was carried out by village farming instructors (Pamong Tani Desa = P. T. D.). The extension workers were changed with the monthly gathering and reporting on the crop status for each type of rice and the amount of rice production. Statistical survey work occupied a large part of their time.

The extension system around Tajum, at least as compared to that of western Java, could certainly not be termed adequate. According to the Initial Project Report, this does not come directly within the scope of this project. However, in view of the ultimate effectiveness of this pilot program, the extension system in this area will remain a large problem. Also, like it or not, if the regional extension system is not adequate it becomes necessary to strengthen the extension centre. This goes against the policy of

changing over to local test stations as described later. It is very desirable at least that an extension system in this area on a par with that in western Java be completed.

3. The Plan for Extension Services of the Pilot Centre

(1) Establishment of Extension System for Farmers

The original purpose of the Pilot Scheme was to provide full irrigation facilities and universal rational waster control thereby improving paddy cultivation and increasing farm production. To disseminate water control techniques, it was necessary to consider an extension organization based on separate farm organizations for each river system. Within the 220 ha Pilot area are 4 sections divided according to the principal waterway used. These sections are divided in accordance with irrigation techniques chiefly according to their water facilities. Each section is further divided into sub-sections of about 10 ha each. The Pilot area is approximately 220 ha so these 4 sections cover about 20 sub-sections.

The farmers working in each sub-section are gathered together in voluntary farm groups known as kelompoks, which are the real extension organizations. There are 20 kelompoks in the Pilot area. An average of two key farmers are selected from each kelompok and it is these key farmers who receive direct training at the Pilot Centre.

However, Indonesian farm villages were originally units known as desa, each with its water control organization (Darma Titra). It is not known how these organization evolved but it appears that they arose voluntarily in the past and were later insitutionalized by the provincial governments. With respect to farming, each has an irrigation chief (ulu2) and a village farming instructor (Pamong Tani Desa/PTD). Under the irrigation chief there is an irrigation organization at the level of individual farmers called the Darma Tirta. The farming instructor also uses this organization for teaching activities. Consequently, the Pilot Centre cannot act without

consideration of the organization. Thus, in forming an agricultural extension organization in the Pilot area it was necessary to combine the Darma Tirta's of the two desas in the area, Desa Tingarjaya and Desa Bantar. The sections and sub-sections in the Pilot area overlap the Darma Tirta organizations of the two desas and care was taken that the key farmers selected from each kelompok were leaders in the Darma Tirta's of these desas as far as possible. This runs counter to the basic policy in extension services of having agricultural extension organizations be voluntary, spontaneously-formed groups. In West Java the idea was strongly advanced of centering extension services in the kelompok and imposing one's own organization on top of that. However, in the case of the Tajum area, where the technical extension system is well-established through local administrative organizations, it was felt that the setting up of another organization within the Pilot area alone would lead to reduced effectiveness, and it would be more appropriate at the present stage to use this kind of administrative organization. However, it is very important that these organizations still be run by the farmers themselves.

Naturally, the extension services are directed at the farmers, not at the paddy fields or the rice. The kelompoks in the Pilot area are formed of those farming in each sub-section. There is therefore a contradiction here. The kelompoks embrace an average of 24.5 households, with as many as 37.8 or as few as 17.8. There are also cases where one farmer must belong to more than one kelompok. This is not rational in terms of the extension organizations. In fact, a study of these organizations was underway locally to map the fields of each farmer and clarify the relationship between farmer and land, which is natural from the standpoint of extension services. Through the present organization, it is hoped that voluntary farmers' organizations will grow into pure technical study organizations and the majority of farmers will participate.

(2) Plan for Extension Services in the Pilot Area

When the pilot centre was initially set up, an extension project was clearly laid out at the same time work began, but for some reason it was not clear. Perhaps, it was thought that these extension services were undertaken after implementing the ideas in the Design Report. In fact, work began quite late. Because of the late arrival of Japanese Experts and material supplies, the plan had to be modified. The situation changed later on, and the initial objectives and the extension services needed to achieve them were also modified. In any case, under the Pilot Scheme various attempts have been made to make the Pilot area much better than the surrounding regions, particularly in terms of paddy cultivation.

The extension concept as elaborated by the local centre with the aid of Japanese Experts was roughly as follows:

a. The following extension activities will be taken up and completed in the Pilot area:

* Full achievement of a double paddy crop through irrigation;
* Dissemination of improved varieties;
* Establishment and dissemination of agronomic standards to raise the paddy yield;
* Dissemination of farm management techniques to raise farm income;
* Establishment of a machine-use system and instruction in how to use machines.

b. The following means will be used to extend these activities throughout the Pilot area:

* An initial study of work by extension workers (including PTD's) in surrounding areas;
* Direct teaching and training of key farmers from each kelompok at the centre;
* Setting up of demonstration plots using improved techniques in each kelompok unit and running of them directly from the centre;

* Since the extension speed is very slow by display work alone, the joint cultivation system will be promoted in each kelompok.

Actual services began with the rainy season in 1972. Because of the abnormal climate and drought in 1972, the situation was virtually unmanageable. Work began in the 1972 - 3 rainy season and the 1973 dry season. Consequently, the organization of extension activities and the realization of service plans do not correspond exactly. Many activities still remain to be undertaken. Of the local service plans, one which was particularly highly praised was the joint cultivation system which has drawn a great deal of attention as an extension method which appeals for direct action on the part of the farmers. However, this is not the same as joint cultivation, as known in Japan, for conservation of labour and increased efficiency. The system implements exactly the same techniques and should be regarded as a system for disseminating techniques. What is being promoted under this system is the establishment of joint nurseries, the joint purchase of seed rice, joint pretreatment, joint fertilization and joint pest and disease control.

(3) Plans for Extension Services to Surrounding Areas

The immediate activities under the Tajum Pilot Scheme does not involve extension services to areas surrounding the Pilot area. However, this is also the Pilot for the Tajum irrigation area of 3,200 ha and it is naturally expected that some projects in the Pilot area will spill over into the surrounding areas. Some of the Indonesian workers from the Pilot Centre have begun extension services to these surrounding areas. At the December 1972 Japan-Indonesia Joint Committee it was decided to plan services to the entire Tajum area, with the Pilot Centre functioning as an extension centre. Since that time, the centre has been actively undertaking extension service to the surrounding areas.

They train key farmers from outside the area, in some cases set up a demonstration farm on a rice paddy of about 10 ha, organize

kelompoks and train the leaders and participate directly in the supervision of demonstration farms.

Extension services in the surrounding areas, as described in the initial Design Report, take advantage of existing extension organizations and farmers organizations and try to perfect these as they engage in extension work. Similarly future centres are being set up as village units using the Darma Tirta as the extension organization. Stress has shifted to extension services through extension workers stationed on the spot. The policy of the Agricultural Technology Directorate has shifted from the extension centre plan to the notion of local water control and test stations. It may be that extension services of the centres themselves are not that actively engaged in, aside from the training of key farmers from outside the area. Extension to the surrounding areas appears to have been left in the hands of existing extension organizations.

Problems involving the 3,200 ha Tajum irrigation area aside, the two desas in the Pilot area, Tinggarjaya and Bantar, must be considered in a different sense because, as described above, the extension organizations in the Pilot area were set up as desa units and overlap the Darma Tirtas as much as possible. If expansion into the surrounding areas were to involve these organizations in each desa, these units would have to engage in extension services on a pilot basis and then extend their experience into the sorrounding areas. In planning such extension services, it will probably prove necessary to set up the two desas as a service unit.

4. The Record of Extension Services and Their Value

(1) Achieving and Double Paddy Rice Crop Through Irrigation

The achievement of a double rice corp through irrigation, a central aim of the Pilot Scheme, was shown to be possible as long as there was an adequate supply of water. Table 2, showing the results of a study by Mr. Shibata on the rice crop situation for each variety, indicates the crop ratio computed on the basis of crop area.

Table 2. Crop for Past 4 years in Pilot Area and Surrounding Areas

Season / Region	71-72 Rainy season			72 Dry season		72-73 Rainy season		73 Dry season		Average
	Paddy area	Crop area	Percentage	Crop area	Percentage	area	Percentage	Crop area	Percentage	Percentage
Pilot area	180.1 ha	- ha	- %	165.0 ha	91.6 %	180.1 ha	100.0 %	180.1 ha	100.0 %	97.2 %
Tinggarjaya	340.0	340.9	100	206.0	60.4	340.9	100.0	340.9	100.0	90.1
Banter	159.5	144.6	90.7	34.0	21.3	159.5	100.0	130.0	85.5	73.4
Jatilawang Regency	1756.0	1658.0	94.9	291.0	16.6	1658.0	94.9	979.0	55.7	65.3

(Prepared by author from results of Mr. Shibata's study)

Table 3. Land Use & Extend of Cultivation in Pilot & Surrounding Areas

Item		Tinggarjaya	Banter	Jatilawang Regency	Pilot Area
Total area		596.17 ha	346.71 ha	4,311.0 ha	220.0 ha
Paddy area		333.54	159.53	1,756.0	180.1
Dry field area		120.24	91.21	1,676.0	-
No. of farm families		1,277	814	8,559	491
Per family	Cultivated area	35.5 a	30.8 a	40.1 a	-
	Paddy area	26.1	19.6	20.5	36.7
	Dry field area	9.4	11.2	19.6	-

(Prepared by author from results of Mr. Shibata's study)

This table shows the crop situation for the 1971 - 2 rainy season, the 1972 dry season, the 1972 - 3 rainy season and the 1973 dry season. A look at the average crop ratios for these four seasons shows a figure of 65.3% for Jatilawang regency as a whole, but 97.2% for the Pilot area -- a double crop throughout virtually the entire area. The reason that 100% was not achieved was that, although extension services began in the dry season of 1972 in the Pilot area, the weather was abnormal and the region was visited by a drought and a crop was not possible over the entire area. Nonetheless the effectiveness of irrigation facilities was high: 91.6% for the Pilot Scheme as opposed to 16.6% for all Jatilawang regency. In subsequent seasons, the crop always reached 100%. As long as there is a supply of water, it is entirely possible to double-crop.

Still, it is not the case that a double crop can be extended into the surrounding areas on the basis of its technical feasibility alone. As shown in Table 1, the Desa Tinggarjaya shows the same crop pattern as the Pilot area, but Desa Bantar which bears the same relationship to the Pilot area, yielded only 81.5% during the 1973 dry season when water was plentiful, so there is a tendency for the crop to drop off during the dry season. If one looks at Jatilawang regency as a whole, there is an adequate crop during the rainy season, but the crop declines distinctly in the dry season. Table 3 shows land use and the scale of cultivation in the surrounding areas. Accordingly, for Jatilawang as a whole, farmers cultivate dry and paddy fields in roughly equal proportions, but agricultural income seems to depend to a large degree on dry field cultivation. This tendency is stronger in Bantar than in Tinggarjaya. In the latter, the dependence on paddy cultivation is much higher than elsewhere. It appears that in areas which are very dependent on dry field cultivation, it is customary to use paddies as dry fields during the dry season. It is dangerous to jump to conclusions, since the breakdown of farm income is not clear, but in order to achieve a double crop one must make a comprehensive study of farm management and incorporate a double crop into the management system.

(2) Extension of Improved Seeds

The improved seeds referred to are PB-5, C4-63, Pelita 1/1 and Pelita 1/2, as recognized under the BIMAS Program. When these are used, the criteria for financing fertilizers, farm funcing and management funding under the BIMAS Program are higher than with conventional seeds. If one calculates the average rainy season crop yield over the past five years, one finds 5.5 t/ha for the improved seeds against 4.2 t/ha for conventional seeds for Jatilawang regency. The same figures for the area around the Pilot area are even further apart: 6.1 t/ha for improved seed and 4.8 t/ha for conventional seed. At any rate, these are all crude bulk figures. Another reason for the discrepancy is that the Pilot area used exclusively Pelita 1/2, while the figures for the regency as a whole are for all four types. The conventional seeds used were Licong, Blester, Bengawan, Thomas, Gonseng, etc. The improved seeds have a much higher yield and are to be disseminated most rapidly. As shown in Table 4, the rate of dissemination in the Pilot area is 50.37%. The distribution of improved seeds was about 60% for all of Jatilawang in the dry season of 1973, which was a higher rate than in the Pilot area. Table 5 shows the trends in the distribution of improved seeds over the past four seasons. Distribution has grown steadily in the Pilot area, however, for Jatilawang regency as a whole, the distribution was as high as 60% in the 1973 dry season but otherwise it has been very unstable. Therefore, it would appear that the conventional seeds have some customary appeal that yield and financing cannot change and some feature such as this makes them difficult for farmers to abandon. There is also the problem of seed rice for the improved seed. In the future, a study of the appeal of conventional rice is needed. However, in the case of the joint cultivation system, common or joint nurseries are very effective in spreading the use of improved seed. In seventeen of the twenty sub-sections there has been seen the appearance of joint nurseries and in all of them Pelita 1/2 is used.

Improved strains are not used at all in the three sub-sections with individual nurseries. Table 5 shows the situation regarding the introduction of improved varieties in all twenty sub-sections. In eleven sub-sections, improved varieties account for more than half. In only one sub-section has the entire area been given over to the improved seed.

(3) Establishment and Dissemination of Agronomic Standards to Raise Paddy Yield

The establishment of agronomic standards and their dissemination in order to increase the production of paddy fields is currently the most important activities of the Pilot Scheme. However, standards of fertilizer use and pest and disease control standards, which form the core of agronomic standards, are determined, along with financial matters, under the BIMAS Program. Even if the remaining standards were determined independently, they would be very difficult to spread among most farmers, unaccompanied by a supply of materials. Therefore, with regard to the setting down of standards, the pilot centre can only make tests on the local applicability of standards for fertilization, pest and disease control scheduling, planting distance, etc., as determined under the BIMAS Program. (See Cultivation Reports for a description of testing) When the pilot centre wants to request a modification in an existing standard on the basis of local test results, it must report to BIMAS headquarters. If BIMAS does not adopt the modification, it cannot be disseminated. On the basis of the BIMAS standards, some provisional agronomic standards were drawn up with the help of Japanese Experts and published under the title "Penanggalan Bercocok Tanam Padi" (published by OTCA in response to a request for standards in Bahasa Indonesia.). The BIMAS standards and the agronomic standards determined by the Centre are shown in Tables 6 and 7. These are demonstrated at the demonstration plots set up with the cooperation of the leaders of each kelompok. However, demonstration alone is not sufficient to disseminate them and this is one reason, as mentioned before, that the joint cultivation method

Table 4. Trends is Distribution of Improved Seed

	71-72 Rainy Season			72 Dry Season			72-73 Rainy Season			73 Dry Season		
	Crop area	Area using improved seed	Percentage of improved seed	Crop area	Area using improved seed	Percentage of improved seed	Crop area	Area using improved seed	Percentage of improved seed	Crop area	Area using improved seed	Percentage of improved seed
	ha	ha	%	ha	ha	%	ha	ha	%	ha	ha	%
Pilot area	180.1	-	-	165.0	38.0	23.03	180.1	82.0	45.53	180.1	90.5	50.25
Tinggarjaya	340.9	98.0	28.7	206.0	33.0	16.02	352.0	108.0	33.23	325.0	137.0	42.15
Banter	144.6	20.0	13.83	34.0	9.0	26.47	135.0	50.0	37.04	130.0	65.0	50.0
Jatilwang Regency	1658.0	657.0	39.62	291.0	62.0	21.30	1658.0	330.0	19.90	979.0	581.0	59.35

(Mr. Shibata study)

Fig. 5 Distribution of Improved Seed in Pilot and Surrounding Areas

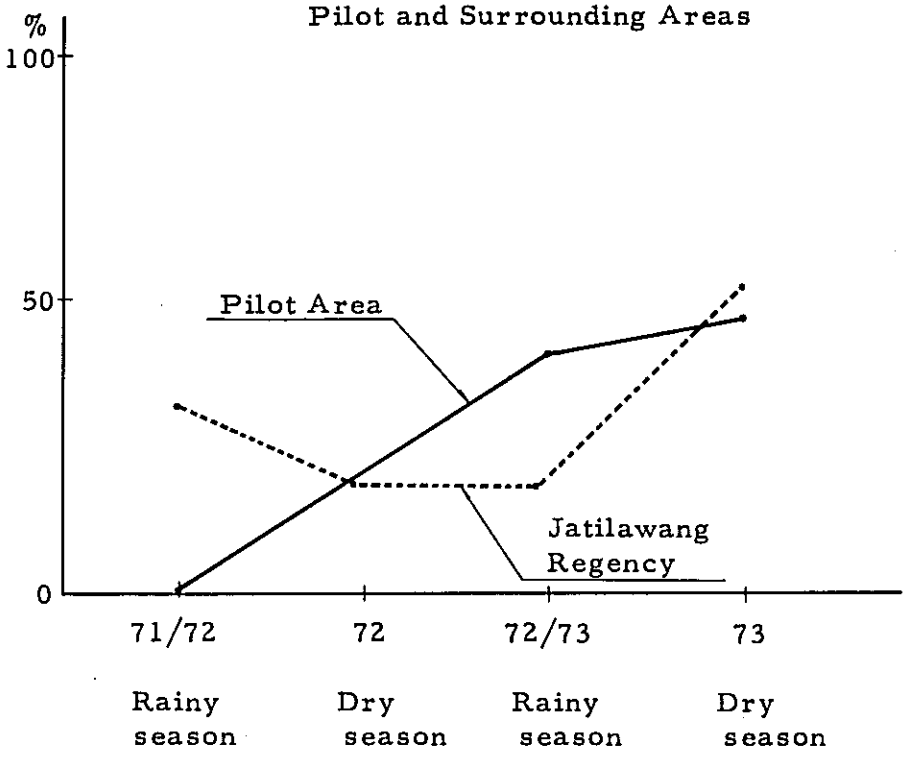


Table 5. Sub-section Using Improved Seed in Pilot Area

Group	No. of Sub-sections
Improved seed only	1
Improved conventional	6
Improved = conventional	7
Improved conventional	3
Conventional only	3
Total	20

(From study by Mr. Shibata)

Table 6. BIMAS Standards for Pilot's Surrounding Areas (per ha)

Item / Material	Improved seed		Conventional seed	
	Standard amount	Cost	Standard amount	Cost
Urea	200 kg	5,320 Rp	100 kg	2,660 Rp
TSP	45	1,125	35	875
Diazimon	2	1,400	2	1,400
Zinc phosphor	100 g	40	100	40
Farm Fund	-	4,000	-	3,000
Spray loan	-	600	-	600
Total	-	12,485	-	8,575

Table 7. Paddy Seeding & Cultivation Standards Determined by Pilot Center (for Improved Seed) (Cont'd)

No. of days after planning of trans-planting	Days	Water Depth	Task	Detail
NURSERY	85		Maturation	
	90	0		
	100	6		
	105	0		
	120		Harvest	

Source: Pananggalam Bercock Tanam Padi

Table 8. Ownership Village Paddy Fields in Tinggarjaya, Bantar

Title	Tinggarjaya	Bantar
Total Area	49.27 ha	34.34 ha
Village Chief, Kepala Desa	7.23	5.56
Assistant, Carik	3.67	2.97
Farm Training Statte	1.55	1.04
Accounting, Tukang Vang	1.54	1.46
Register, Qayim	1.43	1.44
"	1.46	1.45
Other		

is advocated to promote them. The joint cultivation system is in general use only in one kelompok. (Data unavailable for the 1973 dry season). The objectives of the joint cultivation system are joint nurseries, joint fertilization, joint pest and disease control and joint water control. However, there is no need at all on the part of the farmers to act jointly to save labour. So, rather than joint cultivation, this system should be referred to as a joint nursely, total fertilization, total pest and disease control and total water control system and should be understood as a means of disseminating agronomic standards. In fact, an interview survey was carried out with the leaders of the kelompoks that used the joint cultivation system for the 1972-3 rainy season crop with the following results:

Creation of Nurseries --

Joint nursery beds were established in paddies offered by the leaders and the length of the bed allotted to each farmer was determined in accordance with the area he cultivated.

Seed Rice --

Seeds were purchased jointly (improved seeds for the entire area) and seeds selected in common were distributed to each farmer who pretreated his own.

Seeding --

The day for seeding is determined and each farmer seeds his portion of the nursery. Usually seeding can be accomplished on the designated day.

Nursery Operation --

Water control, fertilization and pest and disease control are carried out under the supervision of the leader.

Planting --

In the prescribed season each farmer transplants his share of seedlings to his own paddy. (About one week, from December 28 to January 3).

Paddy Fertilization --

Each farmer does his own fertilizing at the prescribed time and in the prescribed amounts. In the event fertilizer cannot be prepared, it can be borrowed from the centre's supply.

Disease and Pest Control in the Paddies --

Chemicals, preparation method and spreading times are determined and each farmer spreads his own. The desa owns three sprayers and two are borrowed from the centre. They are passed among the families in an agreed upon order. This allows spraying to be completed in a relatively short time.

Paddy Operation --

Each farmer is responsible for his own water control and weeding.

The initial intention was to have a greater degree of joint cultivation. However, the area cultivated by each farmer is different and the amount of labour varies widely so the joint cultivation system took the form described above. A single improved seed variety was agreed upon so peripheral irrigation could be by the plot-to-plot method and water control was quite easy. The joint cultivation system appears to have been absorbed rather easily by the farmers.

The leaders gave the following reasons for the success of the joint cultivation system.

* Irrigation was previously poor because of the location of waterways. Many felt that more effective use could be made of water if everybody constructed them in the same way.
* This kelompok was composed of a total of 24 households and it was easy to organize the workers.
* Of the total cultivated area (9 ha) nearly half was the village paddy field.

The village paddy field is owned by the desa and assigned to the village authorities. They cultivate this in return for their

Table 9. BIMAS & INMAS Participation

Season	71-72 Rainy Season			71-72 Rainy Season			73 Dry Season				
Area / Item	Jatila-wang	Ting-ggarjaya	Bantar	Jatila-wang	Ting-garjaya	Bantar	Pilot area	Jatila-wang	Ting-garjaya	Bantar	Pilot area
Paddy area (ha)	1,658	341	145	1,658	341	160	180	969	341	130	180
BIMAS padde area (ha)	1,100	175	100	997	180	114	33	323	49	60	46
% BIMAS area	66.3	51.3	69.2	60.1	52.6	71.2	18.1	31.9	14.2	46.2	25.3
Total farm families							491				491
BIMAS families							66				35
% BIMAS families							13.4				0.7
INMAS area (ha)				661	161	46	148	657	293	70	155
% INMAS area				39.9	47.4	28.8	81.9	68.1	85.8	53.8	74.7

(Mr. Shibata's survey)

Table 10. Trends: Average Paddy Field Unit: Crude rice t/ha

Season / Seed / Area	69-70 Rainy Season			70-71 Rainy Season			71-72 Rainy Season			72-73 Rainy Season		
	Improved	Conventional	Average	Imp.	Conv.	Avg.	Imp.	Conv.	Avg.	Imp.	Conv.	Avg.
Jatilawang	5.8	4.5	5.1	6.3	5.1	5.2	5.0	3.7	4.0	5.9	4.2	5.0
Tinggarjaya	6.7	5.6	6.1	6.9	4.8	4.7	5.2	4.1	4.6	7.9	4.9	6.3
Bantar	6.4	5.5	5.5	-	4.7	4.7	4.5	3.9	4.2	7.8	4.8	6.3
Pilot area										8.3	5.4	6.7

(Mr. Shibata survey)

services. The village paddy fields of Tingarjaya and Bantar are as shown in Table 8. A problem in the joint cultivation system is the necessity of materials for the production of fertilizers and agricultural chemicals for use with the introduction of improved seed varieties. However, not everyone can prepare these materials and this becomes a bottleneck. Fortunately in the Pilot area one can borrow from the centre's supply and the problem can be resolved rather easily. However, financing is under the BIMAS program and these materials cannot be provided free but only in the form of a loan. The farmer is not requested to repay the loan if he is able to prepare materials on his own from his next season's crop.

The joint cultivation system was in full operation in only one kelompok. Based on an analysis of the results of the joint cultivation system, the complete dissemination of agronomic standards will depend on future work. An indication of the present situation can be obtained by looking at the area or the number of families participating in BIMAS because agricultural standards are based on the BIMAS standards and these households are users of fertilizers and agricultural chemicals. Households which join BIMAS and are able to purchase and use production materials out of their next season's crop are called INMAS (intensifikasi Massal) and these can naturally be regarded as households farming according to BIMAS standards. Consequently, it is possible to a certain extent to measure the spread of agronomic standards by means of the number of such farms and the area involved. On the basis of data gathered on the spot by Mr. Shibata, Table 9 was constructed. Only the area percentages are fully comparable. One sees that BIMAS tends to decrease and INMAS to increase each year. The Pilot area is only on the double-crop system but the opposite tendency is observed. This is because the Centre loan portion is added to INMAS. Farmers receiving loans from the centre participate in BIMAS with the next season's crop and therefore the BIMAS percentage tends to increase. Analyzed in this fashion, it would appear that virtually the entire area uses fertilizers and agricultural chemicals, but this could not

be corroborated.

Next, a technical evaluation of agronomic standards can be made on the basis of paddy yield and the success of extension activities will be reflected in increased yield. Indonesia makes its own study of crop yield with figures for each region. The weather was abnormal for the Pilot area during the 1972 dry season and yield was considerably reduced. The yield in the surrounding areas was about three tons and only slightly more in the Pilot area itself. Table 10 shows the crop for the past four rainy seasons only. This covers only one crop (of the two per year) but reflects a very high yield in the Pilot area, attaining the initial target of 5 t/ha. These figures will probably grow still higher with the spread of improved seed. The established agronomic standards seem adequate at the present stage. The fact that the average yield for the two villages comprising the Pilot area is higher than in the rest of the regency is probably due to the effects of the extension of agronomic standards. However, these figures cover only one crop for the last few years. Only with data covering the dry season as well and extending over several years will it be possible to make a proper evaluation. A problem for the future will be whether or not the initial target of 10 t/ha as a regional average can be attained and whether the double-crop system can be fully implemented. The local centre workers seem very confident that these things can be achieved.

(4) Establishment and Extension of Farm Management Techniques to Increase Farm Income

The initial Pilot Scheme deals not only with the paddy crop but with overall farm management and the nature of farm income. In actuality, however, virtually nothing has been done yet. There has only been some discussion about dry field rotation and steps to use paddy fields for a period between the two paddy crops of 70 - 80 days. Dry fields are usually planted with cassava with legumes as a catch-crop, which does not pose any problems. With respect to the use of the paddies between the two crops, only green beans with

their short growth time would fit in. Therefore, the dependence on wet rice is very high and every effort must be made to achieve a higher paddy rice yield. However, to study farm management, a case-by-case survey of farm management is needed as incorporated in the initial plan and steps must be taken on the basis of these diagnoses. In this area, the Pilot area is a paddy belt while the surrounding area, as stated before, is a half-and-half dry and paddy field area. The ownership pattern in the dry field areas is not known, but an increase in dry field crops should be important in raising farm income. There would appear to be many other problems involved and a time-consuming study should be made and work should be expanded to identify problems and potential solutions.

(5) Establishment of a System of Machinery Use and Instruction in How to Use Machines

Under the initial plan, the Pilot Centre makes adjustments as required locally and a great deal of machinery and equipment has been brought in. The share provided in fiscal year 1971 arrived on the spot in May 1972 and the 1972 share was brought to the centre in July 1973. According to Mr. Kato, the specialist in charge of farm machinery.

"It is taken for granted that a fundamental study of the supply of farm machinery should be made but now, aside from the question of how machinery will be useful in farm management, an important point is the training of the operators who will use the machinery supplied. Training has been provided to two farmers in each kelompok. But the centre workers are able to carry out this training, so the greatest significance is attached to the training of centre staff until February of the year after the agreement expires. Practical on-the-job training is stressed but a good deal of time is spent on trying to eliminate simple break-downs."

In this sense, the ability to operate the machines is obviously a sine qua non. At this stage, the use of farm machinery for (better) farm management is clearly the next step. According to the

manager, Mr. Munawir, there is very little expectation that cultivating machinery can become widespread. Indonesian famers have to high a regard for machines. Every effort was made to use them at any cost in the Pilot area, although no thought was given to extending their use to the surrounding areas. In other words, there was a very negative attitude regarding spreading the techniques of machine operation. Still, sprayers are indispensable for insect control and are in actual use. It was also pointed out that water pumps are very valuable and cannot be lent around. Rice mills should also be as small as possible.

If these are representative of local views, there seems to be a great deal of pessimism regarding farm machinery. Since machines have been provided, they can be displayed and used for the training of operators for the distant future. This sort of use seems very wasteful to the outsider. As the local specialists explain, although there is a basic need to look into the question of supplied machinery, this study should also include the present status of machine utilization. If there is no possibility of purchasing and using machinery might it not be feasible to set up a loan system and actively extend instruction in how to use machinery? Table 11 shows the investment returns for paddy cultivation. According to this models, a tiller is 6,000 Rp. For a larger amount, say a cultivator, the chances of widespread use are nil, even under a loan arrangement. The centre's loan amount is currently fixed at 6,000 Rp. This has still turned into a terrible deficit which, although acceptable during the period when aid is provided, cannot continue indefinitely. The same can be said of power sprayers. This means that there is very little possibility of setting up a machinery loan arrangement unless it is accompanied by the investment of administration funds. Therefore, investment effectiveness must be determined.

For example in the case of a cultivator, the farmers are reported to find it much better than animal-drawn. Thus one should

Table 11. *Investment & Return in Improved Rice Cultivation*

Item	Name	Amounts	Unit cost	Total cost	Percentage of total
Gross profit	Dried seed rice	6,500 kg	22.5 Rp/kg	146,250 Rp	100.0
Seed cost	Seed rice	25 kg	37.5 Rp/kg	937.5 Rp	0.6
Fertilizer	Urea	200 "	26.6 "	5,320 "	3.6
	TSP	45 "	25.0 "	1,125 "	0.8
Agricultural chemicals	Diasinon	2 l	700.0 Rp/l	1,400 "	1.0
	Zinc phosphate	100 g	40.0 Rp/100 g	40 "	0.03
Materials total				8,822.5 "	6.03
Operating cost	Tiller	Cattle or water buffalo			
		12 units	500.0 Rp/unit	6,000 Rp	4.1
	Nursery creation	5 persons	120.0 Rp/person	600 "	0.4
	Nursery post control	1 person	" "	120 "	0.08
	Transplanting	40 "	" "	4,800 "	3.3
	Two weedings	50 "	100.0 "	5,000 "	3.4
	Fertilization	6 "	120.0 "	720 "	0.5
	Sprayin	15 "	" "	1,800 "	1.2
	Harvesting	1/6 x 6,500	22.5 Rp/kg	24,375 "	16.7
	Drying/ Transportation	10 persons	120.0 Rp/person	1,200 "	8.2
	Others	10 persons	" "	1,200 "	8.2
Total				45,815 "	31.3
Misc.	Sprayer rental			600 Rp	0.4
	Water use		22.5 Rp/kg	4,500 "	3.1
Total misc.				5,100 "	3.5
Total				59,735.5 Rp	40.9
Profit				86,512.5 "	59.1

Rp = Rupiah

quickly determine the technical efficiency of mechanical ones in paddy cultivation. To be sure a mechanical cultivator goes deeper than an animal-drawn one, and it should be more valuable in terms of the soil. If it were demonstrably more effective other than just in labour-saving, a loan system accompanied by financial investment should be possible. If the number of cultivators is inadequate, a combined mechanical/animal system could be envisaged, for use in alternate years. In any event, it is agreed that more experiments in machine use are required.

(6) The Center's Training Activities

Table 12 shows a summary of the training activities of the center, as extracted from the "Annual Report on Tajum Pilot Scheme for Fiscal Year 1972/1973". Such services began in earnest in fiscal year 1972. In that year there were seven study meetings lasting 41 days and involving 319 farmers. The subjects covered were both theoretical and practical. Theoretical subjects were discussed at the Centre and practical topics were explained at the paddies set up by the Centre in the Pilot area. The table shows that once farm machine training took place at Sidabowa but this was reportedly because of a lack of water in the Pilot area at that time. The key farmers of each kelompok learn about the agronomic standards under the BIMAS program, farm management techniques, joint cultivation of paddy fields and the structure of the Darma Tirta. Key farmers in charge of water control are taught about the Darma Tirta organization, techniques for maintenance and operation of irrigation facilities, how to distribute water, etc. Farm machinery training covers the operation, maintenance and repair of modern farm machines. Centre staffs and Japanese Experta are responsible for water control, paddy cultivation techniques and the technical subjects, in short. The senior extension worker stationed in the Kewedanaan Jatilawang area is in charge of topics involving the BIMAS Program and agriculture in general. A local official dispatched from the D.P.U.T. also participated with regard to

Table 12. 1972 Training Activities of Centre

Year	Period	No.of days	Place	Participants	No.	Details
1972	8. 7 - 8. 12	6	Centre	Subsection leaders	40	General paddy cultivation techniques
"	9. 25 - 10. 4	10	"	Area tirma-tirta leaders	48	Water control
"	" "	10	"	Operators assistants	44	Water control and agricultural machinery
"	11.22 - 11.24	3	Sidabowa	Operators	44	Farm machinery
1973	1.10 - 1.13	4	Centre	Subsection leaders	48	General paddy cultivation techniques
"	2.20 - 2. 24	5	"	Jatilawang	49	Water control techniques and organizations
"	3.23 - 3.25	3	"	Surrounding demonstrat-ive farms	46	General paddy cultivation techniques
Total		41			319	

irrigation facilities. There were also several study and inspection tours in a microbus. There were visits to two desas where the Darma Tirta organization was exceptionally advanced and two locations were agricultural development projects were underway. Discussions with representatives of the visited Darma Tirtas were reported to have been especially fruitful.

These activities are central to the Centre's extension services in the Pilot area and are a powerful means of extending services into the surrounding area. In this sense, since actual study meetings began in August 1972, seven meetings were held within eight months of that fiscal year. This amounts to nearly one a month, an indication of the importance of these activities. These services have been extended to the surrounding areas since the beginning of fiscal year 1973. In 1973 the pace has slackened somewhat. One reason is that the basic course of the centre and its nature are imprecise and there is a feeling among the local staff that everything has been done and training activities are over. In other words, as long as there are no new trainees, there is no great need for these services. The importance of repetition in training and education needs to be emphasized and further research on training methods is needed to make training more efficient. Thus it is important to establish a curriculum for each subject and instruction plans. These plans must then continuously be followed and the performance evaluated. In many respects, there still remain inadequacies with regard to planned, organized services.

5. Future Problems of Extension Activities

(1) To Give a Clear, Concrete Future Plan for the Pilot Scheme and the Centre

It is the Indonesian Staffs and the Japanese Experts assisting them who actually carry out the extension activities. From its beginning the Tajum Pilot Scheme has had its own definite purpose. Completion of the project, however, does not mean ceasing of activities of the center or the Pilot area. Present activities of the

staff at the site are the foundation stones for the further development of the work involved. The recognition of the importance of the activity as a cornerstone for the future will serve to further promote present activities. Therefore, future plans for the Pilot Scheme and the Centre should be clearly thought out, even though this project may become a matter for the concern of the Indonesian Government itself. With regard to future plans, it was once confirmed that the Centre would be used as an extension service centre. This decision led to much activities slanted towards the provincial area. Later, however, the plan was changed by the Agricultural Technics Directorate to use the Centre as an experimental station for water management. Although this modification had already been discussed when the surveying committee visited there, such change of the plan has had much influence on activities. In other words, there is a great difference in the kind of activities performed when should the Centre continue to be the extension service centre or if it is changed to an experimental station (in which case no extension activities will be expected). The present investigation has resulted in a plan in the direction of the latter. However, there are still many points left unclear including what role the Centre will play as an experimental station. The role will vary in accordance with relations between the Centre and the local experimental sites (24) which belong to the Central Research Institute for Agriculture, the other experimental sites for rise, barley and viciales cultivation under the Directorate of Agricultural Production Development, and the plant protection experimental sites which belong to the Agricultural Technics Directorate. The Centre may become an exhibition and training centre or an extension service, or for basic research. In the latter case, the extension activities will be gradually left to the organizations of the extension service. As described above, the future plans of the Centre greatly affect present activities as well as future ones. Therefore, a clear and well-founded plan for the future should be developed even though this project may become a problems for the Indonesian Government.

(2) To Collect and Arrange the Basic Data Required for the Extension Activities

Putting future plans for the Centre aside, present extension activities to complete the Pilot Scheme should be continued in the Pilot area, and also in the provincial area in order to make known the significance of the Pilot Scheme. Activities have not yet brought sufficient results as stated in the chapter on evaluation, though it may be another matter to define what is the completion of activities. From one point of view, activities are at the starting point, and from another, what is necessary has already been done and waiting further activities which are carried out by the general extension works. In fact, there are some who hold the latter opinion among the Centre staff at the site. The completion of the Pilot Scheme in the Pilot area is the original plan, and as a pilot, it must be aimed at achieving marking results as a whole. In this respect, there is much still remaining to be done.

The first is the collection and arrangement of data required for activities, since it is necessary for the staff in charge of extension activities to have sufficient knowledge and understanding of the farmers for whom they directly act, as activities are based on the human relationship between them. There are 491 farmhouse in the Pilot area. The conditions of farm management and the social structure of these farming communities should be well understood by the staff. House-to-house investigations of farm houses was scheduled in the original plan. This turned out to be insufficient. Although it is felt by some of the staff that the stagnation of the activity is attributable to other kindering social elements, for which they are not responsible, (because all required has already been done, for instance farmers organizations for extension acticiti have been established, subject countermeasures established and the group cultivation system adopted for prompting the project). The opinion, however, is quite strong that this will not bring vivid and positive results at all. At least, more analytical investigations

on what the obstacles are and whether it is possible to get rid of the obstacles are needed in order to promote further extension activities. In addition, more detailed investigation of every farm-house is necessary, on which plans for farm management may be based. How to carry out these investigation and how to select the items for consideration are the important points in this assistance. It is desirable to record the actual conditions of every farmer if possible, and to file and arrange this information for further analysis. Special advice and assistances will be required for analysis and synthesis of the results obtained by the investigation.

As above described, the Centre staff should have a clear knowledge of the conditions of the farmer and know how to make the most of this information.

(3) To Draw Up Clear Guidance Programs for the Extension Service

Extension activity is a cycle involving planning which determines content, means, period, extent, execution, evaluation of the results, and modification. Therefore, guidance programs should be made on the basis of a good understandings of not only the conditions of the farmers but also measures for the solutions for their problems. Each program the activities is scheduled to be completed step by step, which will serve to high light the activities. The establishment of guidance programs may be quite helpful for the activities.

Although the Pilot Scheme has general ideas and plans for extension service as a whole, concrete, actual activities are carried out individually at twenty different kelompoks (joint working group). Consequently, there are some difference between activities at each kelompok. Since it is impossible to make up twenty plans suitable for individual kelompoks simultaninously, some important kelompoks should be selected, to which the programs are drawn up. These selected kelompoks will become centres, from which activities will be disseminated. In this way, the rate of extension will be accelerated.

The establishment of the training course which constitute an important part of the guidance programs, is also needed. During training, trainees are tought necessary techniques in which they will become expert. In other words, each trainee will be able to manage necessary activities by himself. For this purpose, training courses are established determining content, and methods, etc. As to this point, however, there do not seem to be sufficient, workable plans for the training program made by the Centre. Therefore, the arrangement of training course will be one of the important points of assistance. Once training courses are settled, teaching materials can be prepared according to the plan, and more effective training methods such as audio-visual methods can be used more easily. The use of films was also mentioned at the meeting at the project site. It is desirable to help in preparation of these teaching matters, taking up events and things close to their daily life not beforehand but at the site, if possible.

(4) To Cooperate with the Organizations of the Extension Service and to Back Them Up in Consolidation

Looking into the future of the Tajum Pilot Scheme, what is carried out at the Pilot area will be disseminated by the extension workers in this area. Especially when operating the site as an experimental station is confirmed, extension activities may be left to the extension service. In this respect, cooperation between the Pilot Centre and the extension workers in this area is most important. According to Mr. Munawil, a manager of the Centre, the project will proceed as follows; research or experiment trial demonstration extension. Also, the Centre has constituted a part of "demonstration" and "extension" together with partial "trial". In the future, however, more emphasis will be put on "research or experimental" and "trial" with regard to water management, and other subjects. The Centre will play a role of "trial", "demonstration", and "extension". In other words, the authorities consider that research and experiment will be separated from extension activities. That is, they will be independent of each other, although

it does not seem that the Centre has enough personnel and facilities to have these sections devided.

The Pilot Scheme cannot be carried out without regard for policy of the Indonesian government, even though there is no direct connection between the aim of the Project and the future policy of the Indonesian Government. The Centre staff and the Japanese Experts who are promoting and carrying out activities at present will be asked to help by the Indonesian authorities. Advice on the method or facilities required for research and experiment may also be requested.

In a situation of this kind, it is important to make every effort to carry out extension activities in the area in order to complete the Pilot Scheme as soon as possible. At the same time, it is equally important that the results and experience obtained during the activity should be evaluated and that the organizations of extension service be informed of the results of this evaluation. In this regard the Centre should take a possitive attitude for having a meeting with extension workers and for giving training to them. A future role which the Centre will play in carrying out activities is one of a training centre which concentrates on determination of information to be and furnished to the organizations of extension services, leaving actual extending activities to the latter. This agree with the policy of the Indonesia authorities.

In addition, from the point view of future plans, the present, direct extending activities carried by the Centre staff are said to be covering up the weakness of the organizations, which should be consolidated to carry out their duties better. In other words, the plan for the future use of the Centre as an experimental and training centre will be accomplished only when the organizations become stronger and able to replace the Centre in carrying out extension activities. For this purpose, training of new extension workers as well as those in charge of activities at present should be excelerated. There are many related problems to be solved including advice to

the authorities of Indonesia, in order to gain good and lasting evaluations on the results of the Pilot Scheme. At least, advice on the control of organizations settled at West and Central Java province should be given.

IV-3. Cultivation

1. Present State of Land Usage

The Pilot area covers a cultivated land area of about 220 ha, extending over two desas, consisting, mainly of paddy fields, Desa Tinggarjaya and Desa Banter. The soil thereof is of the humus type which belongs to neo-alluvium and the topographical features are flat.

The present state of land usage and the population in the two desas is as follows:

Land usage:

Land Classification \ Desa	Desa Tinggarjaya	Desa Banter	Total
Paddy fields	334 ha	160 ha	494 ha
Upland fields	120	91	211
Area of Desa	137	92	229
Others	5	4	9
Total	596	347	943

Population:

Classification \ Desa		Desa Tinggarjaya	Desa Banter	Total
Population	Male	3,367 (persons)	1,987 (persons)	5,354 (persons)
	Female	3,348	1,971	5,319
	Total	6,715	3,958	19,673
No. of Farm Households		1,277 (households)	814 (households)	2,091 (households)
Paddy field area per farm households		0.26(ha)	0.20(ha)	0.24(ha)
Cultivated area per household		0.36	0.31	0.32

2. Joint Cultivation

(1) Contents of This Cultivation Study

Cultivation techniques are based on the BIMAS standard to increase land productivity, and the following techniques are being practiced at the centre of collective cultivation:

a. Standardization of particulars in each irrigation system,
b. Water control,
c. Standardization of rice planting periods,
d. Cultivation of healthy seedlings by means of joint nursey beds,
e. Appropriate periods and quantities of fertilization and joint fertilization work,
f. Establishment of joint work on insect, pest and disease control.

Improved varieties specified in the BIMAS standard are PB-5, C4-63, Pelita 1/1, Pelita 1/2. All these varieties are to be standardized under a single variety.

To elaborate further, the BIMAS standard is as follows:

	Improved varieties		Local varieties	
Urea	200 kg	5,320 RP	100 kg	2,660 RP
TSP	45	1,125	35	875
Diazinon	2	1,400	2	1,400
Phosphorous zinc	100 g	40	100 g	40
Farming capital		4,000		4,000
Sprayer rental		600		660
Total		12,485		8,575

(2) Aim of Cultivation

a. It is most important to make all farmers in the Pilot area cooperate in the increase of their farm production as a collected body.

To that end, the leaders of the Kelompok should be trained in joint management of nursery beds, rice planting schedules,

fertilization schedules, and insect, pest, and disease control work. This is to bring about an overall increase in farm production with less variation in the harvest output of each harm.

b. Since appropriate water control is an essential factor in the development of rice growing techniques, a water control system is to be established in the present Pilot area.

Accordingly, it should be possible to standardize rice growing periods for collective cultivation.

(3) Essentials for Collective Cultivation

In the present stage, the following two items are important conditions:

a. It is necessary to establish farm groups of types which have the approximate same growing seasons,

b. It is important to standardize rice planting periods by joint nursery beds.

The above mentioned can immediately be brought in operation. (In fact, some Kelompok are already in operation).

Accordingly, it is necessary to systematically conform the joint cultivation and joint insect, pest, and disease control programs and fertilizing works to existing situation in the rural community.

(4) Examples of Joint Cultivation

The Joint Cultivation was formerly practiced in rainy season corpping during the period 1972 - 1973 in the present area of 220 ha, and in one kelompok (8 sub-section of the 3rd section) out of 20 kelompok (about 10 ha per kelompok on the average). The outline on this is as follows:

a.	Area of kelompok	:	9.0 ha/24 farmers
b.	Area by variety grown	:	1elita/9 ha
c.	Area of joint nursey bed	:	0.5 ha/1 place
d.	Number of days and laborers needed in preparing nursey bed	:	2 days and 14 men labor in plowing, puddling, bed preparation and seeding.

e.	Period	:	2 days for seeding, 7 days for rice planting, 12 days for reaping.
f.	Yield (in weight with panicles)	:	7.6 t/ha/at maximum 7.0 t/ha/at minimum 7.5 t/ha/on the average
	(in weight with unhulled rice)		6.0 t/ha/at maximum 4.2 t/ha/at minimum 5.0 t/ha/on the average

For further information, the management of this Kelompok was maintained as in the following:

a. In the two meetings held to discuss the practice of Joint cultivation, the location of joint nursey beds and the use of power tillers for plowing and puddling were decided upon.

b. In the use of seeding, fertilizers, farm chemicals, etc., each farmer apllied the BIMAS program.

c. Land offered by two farmers was used for the joint nursery bed.

d. In ground cultivation and preparation for the nursery bed, labor service was employed at the rate of 4 men per ha of paddy fields, 2 men per 0.5 ha, and one man per 0.25 ha, respectively.

e. The cost of fertilizers for the nursery bed was set in proportion to the area used by the individual.

f. Water control for the nursey bed was carried out by farmers in charge of water distribution in the said section.

g. Gop-dressing was carried out by the individual farmers, with the latter having the option to decide schedules and frequency.

h. Seedlings were allotted to each farmer prior to the rice planting.

In the execution of collective cultivation, technical guidance took place in field operations in the main fields, especially regarding conduct of fertilization and pests control.

However, some problems remained because the farmers did not comply completely with the guidance program.

(5) Present State of Joint Cultivation

As stated in the preceding (4), it can be said that joint cultivation (joint nursery beds which was practived by 17 Kelompok out of 20 Kilompok at the rainy season in 1973) was beneficial through the successful management of the model joint cultivation conducted in the rainy season cropping during that period.

To elaborate further, the statistics on conditions of joint cultivation in the dry-season of 1973 can be seen as follows:

Actual State of Paddy Rice Growing and Joint Cultivation
in the Dry-Season, 1973.

a) Improved variety: Pelita 1/2

Local varieties: Several varieties of Licong, Blester and Bengawan, etc.

Section	Kelompok	Area of sample cropped		Seeding periods	Transplanting period	Anticipated period of harvest	Pattern of joint cultivation
		Improved variety	Local varieties				
Jatilawang	1	6.0 ha	4.0 ha	4/25-5/5	5/10-5/29	9/15-9/30	A1-2, C-3
	2	4.0	4.0	4/50-5/2	5/23-6/3	9/25-10/10	A1-2, C-3
I	3	4.0	4.0	5/3-5/5	5/28-6/1	9/27-10/12	A1-2, C-3
	4	5.0	5.0	4/29-5/2	5/18-5/28	9/19-10/14	A1-2, C-3
	5	4.0	6.0	4/23-26	5/20-8	9/20-10/5	A1-2, C-3
	6	5.0	5.0	4/29-5/1	5/18-27	9/19-10/4	A1-2, C-3
	1	7.0	3.0	4/29-5/2	5/17-25	9/19-10/4	A1-1, C-3
II	2	3.0	9.0	5/2-15	5/20-30	9/24-10/4	A1-1, C-3
	3	6.0	4.0	4/23-26	5/16-30	9/19-10/4	A1-2, C-3
	1	7.5	2.5	4/29-5/3	5/22-30	9/23-10/8	A1-1, C-1
	2	5.0	5.0	4/24-4/28	5/21-31	9/22-10/7	A1-1, C-1
	3	6.0	4.0	4/23-26	5/16-30	9/19-10/4	A1-2. C-3
III	4	5.0	5.0	4/25-27	5/24-6/1	9/25-10/10	A1-2, C-3
	5	1.0	9.0	4/28	5/20	9/17-10/2	A1-1, C-3
	6	3.0	3.0	4/21-5/2	4/21-5/2	9/22-10/7	A1-1, C-3
IV	-	10.0	5.0	4/30-5/2	5/23-30	9/23-10/8	A-2, C-3
	1	9.0	-	5/3	5/25-31	9/23-29	A-1
Banter	2						A-3
I	3						D-3
	4						D-3
	Total	90.5	89.6	4/21-5/15	5/10-6/3	9/15-10/12	-

Joint nursery beds were set up at 17 Kelompok excepting Banter Section I and Kelompok 2, 3, 4.

The patterns of collective cultivation are shown in the following table.

b) Classified patterns of paddy rice collective cultivation:

Legend: * 0 - possible
x - impossible
- possible, but inefficient

Variety	Nursey bed	Variety introduced to:	Variety in group or scattered	Transplanting period	Section	Fertilizing	Pest control	Correct water control	Upland field crops
Improved + variety	Joint nursery bed	Whole area	Group	Timed	A-1	o	o	o	o
		Partial area	Group	Timed	A-1	o	o	x	x
			Scattered	Timed	A_1-2			x	x
Improved + variety	Personal nursery bed	Whole area	Group	Timed	B-1	o	o	o	o
			Group	Not Timed	B-2	x	x	x	x
		Partial area	Group	Timed	B-1	o	o	x	x
			Group	Not Timed	B_1-2	x	x	x	x
			Scattered	Not Timed	B_1-3	x	x	x	x
Local variety	+	Group nursery bed	Group	Timed	C-1	o	o	x	x
			Scattered	Timed	C-2			x	x
			Scattered	Not Timed	C-3	x	x	x	x
Local variety	+	Personal nursery bed	Group	Timed	D-1	o	o	x	x
			Group	Not Timed	D-2	x	x	x	x
			Scattered	Not Timed	D-3	x	x	x	x

(Reference)

Field Experimental Data of Paddy Rice:

1) Experiment dressing period:

a)	Variety:	Pelita	1 & 2
b)	Based fertilizers:	Urea	40 kg + TS 75 kg
c)	1st top dressing:	Urea	80 kg
d)	2nd top dressing:	Urea	80 kg

	Days	Number of Panicles per hill	Height of Tillers
A.	0 - 10 - 65	9.5	12.4 cm
B.	0 - 15 - 65	9.9	13
C.	0 - 30 - 65	9.6	12.3
C.	0 - 25 - 65	9.6	13.8
E.	0 - 30 - 65	9.6	12

2) Experiment on Spacing:

	Spacing	Number of Panicles/m^2	Height of Tillers
A.	20 x 20 cm	270	77.3 cm
B.	25 x 25	243.2	83.2
C.	20 x 15	288.6	80.8
D.	25 x 20	226	83.1

3) Experiment on Insect and Pest Control:

		Number of Panicles per hill	Height of Tillers	Dried grain 100kg/ha	Rate of Insect Killing
A.	BHC Power	15.1	122	77.5	2
B.	Diazinon G + Sumithion	8	110	64.5	44.8
C.	Diazinon G	11.9	121	70.6	13
D.	BHC-G + Sumithion	31.8	119	75.6	6.2
E.	Non	77	105	63.6	8.1

3. Trends of Varieties

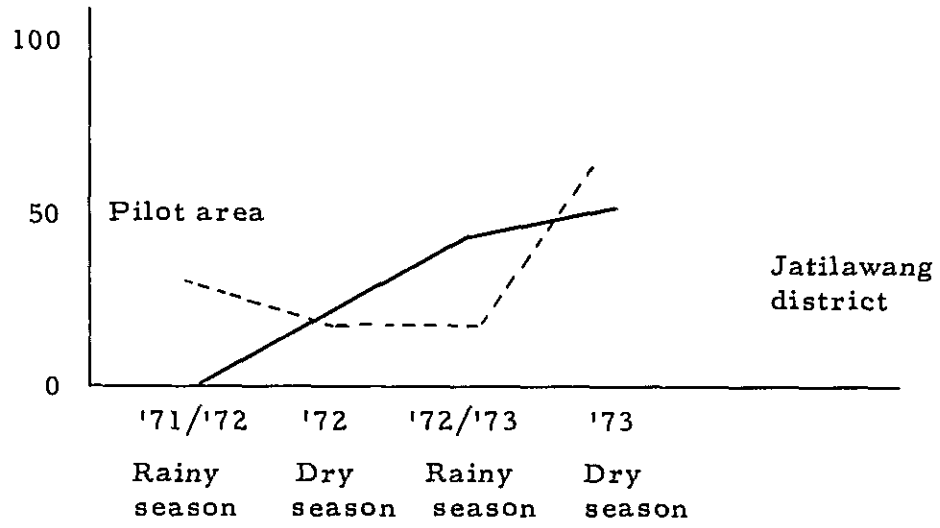
(1) Transition of New Variety Cultivation

Cultivation of improved varieties at both Desa Tinggarjaya and Desa Banter has accounted for rapid progress as compared with the rainy-season 1971/1972.

In the dryseason 1973, the improve varieties were grown on a field of about 90 ha out of the total cultivated area of 180 ha in the Pilot area.

Transition of improved varieties during the period from the rainy-season 1971/1972 through the dry-season 1973 is indicated in the following chart.

Dissemination of Improved Variety



Area	Period	Cropped area (1)	Cropped area with Improve variety (2)	Percentage of (2)/(1)
Tinggarjaya	1971/1972	341 ha	98 ha	28.7 %
Banter	Rainy season	145	20	13.8
Tinggarjaya	1972	206	33	16.0
Banter	Dry season	34	9	26.4
Pilot		165	98	23.0
Tinggarjaya	1972/1973	325	108	33.2
Banter	Rainy season	135	50	37.0
Pilot		180	82	45.5
Tinggarjaya	1973	325	137	42.1
Banter	Dry season	130	65	50.0
Pilot		180	91	50.2

(2) Trial Balance of Management in Paddy Cultivation by Variety I

A sample of trial balance in paddy rice management as applied to both new and local varieties is shown in the following table:

Source: Information material reported by agricultural experts

a) Trial Balance Between Input and Output in Paddy Cultivation: (Improved variety, Unit: per ha)

Item	Article	Quantity	Unit cost	Sum	% Distribution to Gross income
Gross income	Dried grains with hull	6,500 kg	22.5 RP/kg	146,250 RP	100 %
Seed cost	Seed grains	25 kg	37.5 RP/kg	937.5 RP	0.641 %
Fertilizer cost	Urea	200 kg	26.6 RP/kg	5,320 RP	3.638
	TSP	45 kg	25 RP/kg	1,125	0.957
Farm chemical	Diazinon (emulsion)	2	700 RP/	1,400	0.957
cost	Phosphorous zinc	100 g	40 RP/100g	40	0.027
Sub Total				8,822.5	6.032
Operational cost	Plowing, Paddling	12 unit (cattle or carabas)	500 unit	6,000	4.102
	Nursey bed set-up	5 persons	120 RP/man	600	0.410
	Pest control in nursey bed	1 person	120 RT/man	120	0.082
	Seedling Transplanting	40 persons	120 RP/man	4,800	3.282
	Weeding (twice)	50 persons	100 RP/man	5,000	3.420
	Fertilizing	6 persons	120 RP/man	720	0.492
	Chemical spraying	15 persons	120 RP/man	1,800	1.231
	Harvesting	1/6 x 6500 kg	22.5 RP/kg	24,375	16.666
	Drying, Transportation	10 persons	120 RP/g	1,200	0.820
	Other work	10 persons	120 RP/kg	1,200	0.820
Sub Total				45,815	31.325
Others	Sprayer Rental			600	0.410
	Irrigation cost	200 kg (grain with hull)	22.5 RP/kg	4,500	3.077
				5,100	3.480
Total				59,737.5	40.846

Profit in Balance: 146,250 - 59,737.5 = 86,512.5

Production Cost per capita (59,737.5 6500) x 1000 = 9,190.3 RP

b) Trial Balance between Input and Output II: (Local variety Unit: per ha)

	Item	Article	Quantity	Unit cost	Sum	% Distribution to gross income
	Gross income	Dry grain with hull	4,200 kg	22.5 RP/kg	94,500 RP	100 %
Material cost	Seedling cost	Seed grains	30 kg	30 kg	900.	0.952%
	Fertilizing	Urea	100 kg	26.6	2,660.	2.814
	equipment	TSP	35 kg	25.	875.	0.925
	Chemicals	Phosphorous zinc	100 g	40 /100g	40.	0.043
	Sub Total				5,875.	6.215
Operational cost	Plowing, Paddling		12 unit	500 RP/unit	6,000.	6.349
	Nursery bed set-up		5 persons	120 RP/man	600.	0.635
	Pest control in Nursery		1 person	120 /man	120.	0.127
	Seedling Transplanting		40 persons	120 /man	4,800.	5.079
	Weeding (twide)		50 persons	100 /man	5,000.	5.291
	Fertilizing equipment		6 person	130 /man	720.	0.762
	Chemical Spraying		15 persons	120 /man	1,800.	1.905
	Harvest		1/6 x 4,200	22.5 /kg	15,750.	16.666
	Drying & Transportation		8 persons	120 /man	960.	1.016
	Others		10 persons	120	1,200.	1.270
	Sub Total				36,950.	39.100
Others	Sprayer Rental				600.	0.635
	Irrigation		200 kg grains with hull	25.5 /kg	4,500.	4.762
	Sub Total				5,100.	5.397
	Total				47,925.	50.714 %

Profit in Balance: 94,500 - 47,925 = 46,925 -- RP

Production cost per capita (47,925 4,200) x 1000 = 11,410.7 RP

c) Comparison Between Improved Variety and Local Varieties:
(Based on Trial Balance between Input and Output)

		Improved variety		Local variety		Remarks
		Sum	% to gross income	Sum	% to gross income	
Production cost per ha	Material cost	8,822.5	6,032 %	5,875	6,215 %	Material cost is based on the standard of BIMAS Program. For Labor cost, the harvest with rice-knife (Ani Ani) is converted to value on the assumption that the harvest is shared at the rate of 1/6.
	Labor cost	45,815	31,325	36,950	39,100	
	Others	5,100	3,487	5,100	5,397	
	Total	59,737.5	40,846	47,925	50,714	
Harvest Yield per labor hour		$\frac{6,500}{1,827}$ = 3,558 (kg)		$\frac{4,200}{1,674}$ = 2,508 (kg)		
Production cost per capita		$\frac{59,737.5}{6,500} \times 7,000$ = 9,190.3 RP		$\frac{47,925}{4,200} \times 1,000$ = 11,410.7 RP		
Gross income per Labor hour	A. In case labor cost is regarded as employed labor	$\frac{86,512.5}{1,827}$ = 47,352 RP		$\frac{46,575}{1,674}$ = 27,822 RP		Actually, labor power consists of a combined 2 kind pattern of labor.
	B. In case labor cost is regarded as labor income from family labor	$\frac{86,512.5 + 45,815}{1,827}$ = 72,429 RP		$\frac{46,575 + 36,950}{1,674}$ = 48,895 RP		
Income Rate	In case of (A) above mentioned	$\frac{86,512.5}{146,250} \times 100$ = 59.154%		$\frac{46.575}{94,500} \times 100$ = 49.285%		
	In case of (B) above mentioned	$\frac{86,512.5 + 45,815}{146,250} \times 100$		$\frac{46,575 + 36,950}{94,500} \times 100$ = 88.39%		

Note: See next page

Note:
- o Working hours per capita per diem are assumed to be 7 hours.
- o Harvesting operations with Ani Ani to cut panicles are assumed to be 100 man/ha in improved variety, are 88 men/ha in local varieties.
- o Returns per capita from Ani Ani are estimated as in the following (based on trial balance between input and output).

  Improved variety: 243.75 RP (10.833 kg)/day/person
  Local varieties: 196.87 RP (8.750 kg)/day/person

4. Quantity of Rice Produced

Regarding the quantity of rice produced, in accordance with the scheme of water control and joint cultivation, the yield of rainy-season 1972/1973 at the Pilot area was shown to be 8.3 tons per ha in improved varieties, and 5.4 tons per ha in local varieties giving a mean yield of 6.7 ton per ha, and as compared with a mean yield of 4.5 tons per ha at the 2 desas during the period 1967 - 1968. This illustrates about a 50% increase.

Transition of rice production during the period from 1967 - 1968 through 1972 - 1973 is shown in the following table:

Transition of Rice Production: (Unit: ton/ha)

Note:
1. The quantity of rice produced is indicated by weight of grain with hull. Also note all crops were grown in rainy-seasons.
2. Asterisks (*) represent quantity of production in districts covered by the BIMAS program.

Year	Sections	Improved varieties (ton)	Local varieties (ton)	Average (ton)
1967 - 1968	Desa Tinggarjaya	4.4	3.8	4.6
	Desa Banter	4.6	4.0	4.3
	Kecamatan Jatilawang	4.0	3.8	3.9
1968-1969	Tinggarjaya	5.3	4.8	5.0
	Banter	-	4.9	4.9
	Kecamatan Jatilawang	5.3	4.2	4.7
1969-1970	Tinggarjaya	6.7	5.6	6.1
	Banter	6.4	5.5	5.5
	Kecamatan	5.8	4.5	5.1
1970-1971	Tinggarjaya	6.9	4.8	5.8
	Banter	-	4.7	4.7
	Kecamatan	6.3	5.1	5.2
1971-1972	Tinggarjaya			
	Banter			
	Kecamatan			
1972-1973	Tinggarjaya	7.9	4.9	6.3
	Banter	7.8	4.8	6.3
	Kecamatan	5.9	4.2	5.0
	Pilot Area	8.25	5.4	6.697

Source of Reference: Agricultural Extension Service; Jatilawang

Note: Improved varieties grown during the period 1967-1968 were local varieties such as Bengawan, Syntha, etc., and those during the period 1968-1969 and henceforth were improved varieties of good yielding ability such as PB-5(IR-5) (begun in 1968-1969), C4-65 and IR-5 (begun in 1969-1970), and Pelita (begun in 1971-1972).
Presently, Pelita is most widely used over the area. Others include PB-5 and C4-63 (begun in 1971-1972).

5. Present Situation of Rice Growing Techniques

As stated previously, the development of the BIMAS program, as attracted the interest of farmers to the application of fertilizers and farm chemicals, they have also begun to switch to fertilized rice growing.

The present situation of rice growing techniques can be described as follows:

(1) Improved Varieties

Recently invented varieties (based on BIMAS Standard) such as PB-5, C4-63, Pelita 1/1 and Pelita 1/2, are being utilized.

According to the program, the primary aim is to obtain rate of 50% in the whole area.

In this sense, the aim has been achieved as well as can be expected.

(2) Nursey Bed Preparation

Regarding nursey beds, submerged nursery beds provided with stripe-cutting beds are widely used by many of the farmers.

In the cultivation of local varieties, no fertilizers are applied, seeds are sown thickly, and many days are required for the growth of seedlings in the nursery beds.

As a result, these so-called seedlings were an obstruction to paddy rice growing techniques. However, with the introduction of the improved varieties, these seedlings are now thinly sown at the rate of 80 gr/m^2 and the required days in the nursery beds has dropped to 20 - 25 days on the average.

(3) Preparation of the Main Paddy Field

Plowing and puddling in the main field is done by cattle or manual labor.

The tilth is ordinarily shallow (less than 10 inches).

Raw straw is plowed in soil in many places, however, in such fields where rice-root rot is liable to occur frequently, it is usually taken from the field or burnt up on the field.

(4) Planting

Planting by cross-check patterns of 25 x 25 cm and 20 x 20 cm is applied over the area.

Generally, deep planting, to a depth of 7 cm on the average, now prevails.

(5) Application of Fertilizers

Some farmers apply 3 applications of basal dressing (before planting or immediately after the rice planting), or top-dressing at the filling stage (20 - 30 days after rice planting), or top-dressing at the spikelet initiation stage (50 days after planting).

Dressing quantity based on the BIMAS standard is 20 kg/ha of urea, 45 kg/ha of TSP in the case of improved varieties, and 100 kg/ha of urea, 35 kg/ha of TSP in the case of local varieties, respectively.

(6) Insect, Pest and Disease Control

In the BIMAS standard, it is specified that 2 applications of pest control should be done to eradicate stem borer at a stated period. Pest control, however, is not so commonly practiced by the farmers this area was also seriously infested by rice stem midge which caused great damage in this area.

However, since the farmers are poorly informed on pest control, a pest prediction system is desirable and should be established on the basis of cooperation between the Government and farmers organizations, aiming at enlightening farmers regarding early detection and prevention.

To shift the conventional farming methods to farming by means of the improved varieties, (fertilized rice growing, good grain

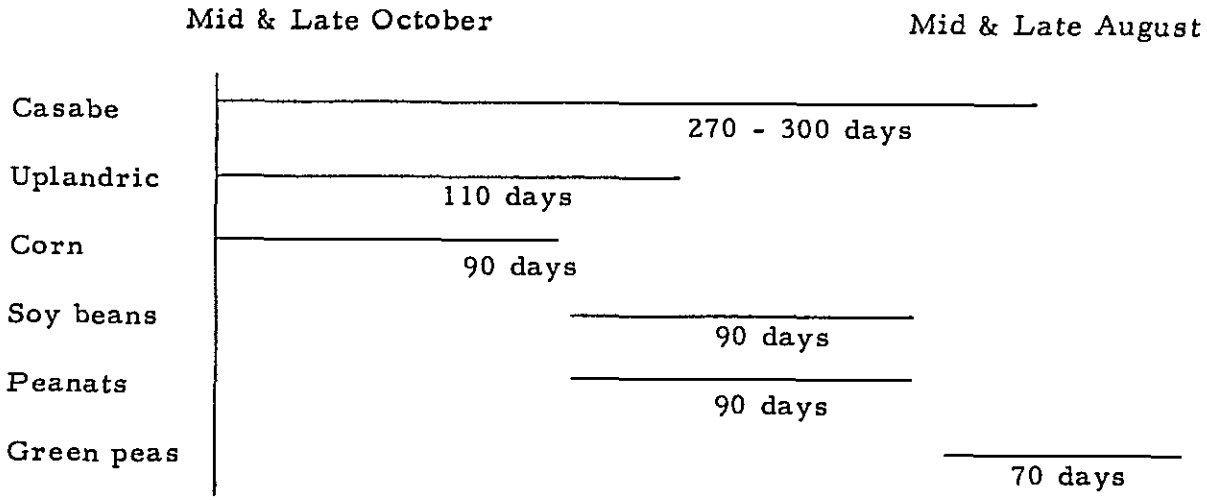
yielding methods and highly developed rice growing, methods) it is vital to take measures not only regarding insect control but disease control as well disease damage in this area is usually caused by rice white withering, and rice leaf spot withering.

6. Upland Field Cultivation

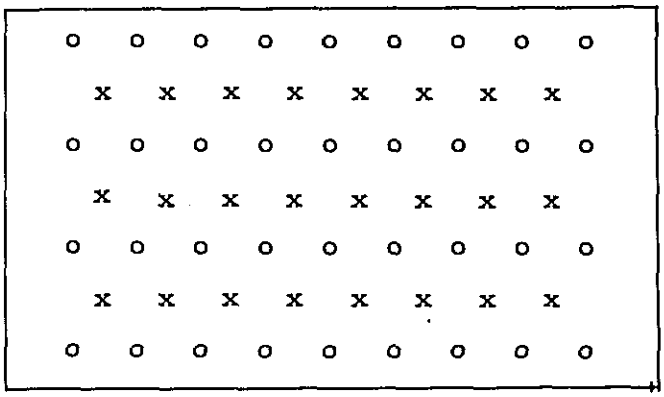
(1) Present State of Upland Field Cultivation

In the Pilot area are found scattered fields in 10 ha. plots. The owners of the upland fields in each Kelompok are growing crops when the choose, and it is considered to be advantageous for them to continue their farming in a similar manner in the future.

The crop rotation is generally maintained as is shown in the following chart:



Field Plot



Legend: o mark indicates casaba.

x mark indicates other crops

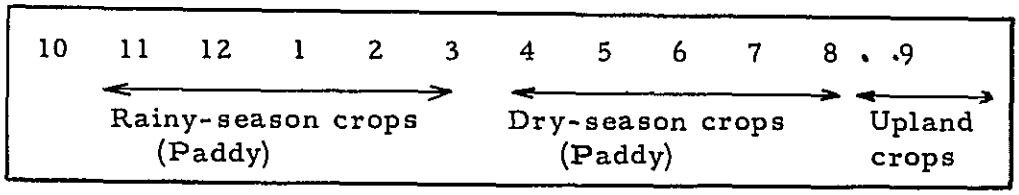
Other crops are grown as inter-crops between casaba.

(2) Present Situation of Upland Cropping on Paddy Fields

In the Pilot area, the land used by means of irrigation with the centre of rice cultivation lies at the core of the Pilot Scheme. In considering land usage, however, it is necessary to note that there is a period of 70 - 90 days between dry season cropping and rainy season cropping.

When, in future, joint cultivation is firmly established and water control is being perfectly conducted, it would be essential to organize a cropping system due to the possibility of introducing other crops (eg. green peas) which can be grown as accompanying crops in this period.

Cropping Pattern



7. Cultivation and Farm Machinery

In regards to the introduction of farm machinery, it is considered that in order to adopt an annual-3-cropping pattern (paddy paddy upland crop) it is necessary to introduce farm machinery, especially for plowing and harvesting operations, to reduce the need of manual labor.

The farm management is designed so as to introduce farm machinery in accordance the above-mentioned report.

Farm machinery which are currently being introduced are as follows:

Name	Number of Sets
Power Thresher	12
Knapsack Type Sprayer	15
Power Sprayer	2
Power Tillers (8 HP)	10 - 12
Power Tillers (6 HP)	15
Dryer	1
Rice Huller	1
Trailers	20
Rice Mill	1
Binder	1
Combine	1
Tractor (Four wheel)	1

In considering the actual situations in the rural community, (eg. farm management, social conditions), it can be seen that not all the machinery in use is akin to that of the farm management. Of this farm machinery, those in use which have a comparatively close link with farm management are limited in number to a few including sprayers and rice mills. Such major machinery as power tiller is being used in trial stages for training purposes at the Pilot Centre.

8. Problems of Future Development

Presently, in the Pilot area, preparations are well underway for the improvement of rice cultivation by means of joint cultivation.

Joint cultivation is a type of farm management system which applys an agronomical standard based on the introduction of improved varieties, the establishment of joint nursery beds, the standerdization of rice planting periods, and the application of the BIMAS standard, but it is not the kind of joint cultivation which is sufficiently systematized to utilize farm machinery, joint pest control and fertilization work.

In other words, such a program should begin in familiarity with situations already rooted in the rural community and by carefully amalgamating the highly developed technical advances, improved farm management systems, and changes of socioeconomical conditions.

However, since rice production by the present joint cultivation system is expected to promote an increase in grain yield, we can appreciate, in that aspect, the fruit of their labor, and it may be said that the foundation goals have been already accomplished.

For further development of cultivation techniques, special consideration must be paid to the arrangement of various techniques and the wide-range applications thereof.

The following are required to examine more closely the meaning of the program.

(1) Joint pest control, joint fertilizing must be established, and a "chain-link" of related operational systems, based on collective cultivation techniques must be formed.

(2) Improvement of rice growing techniques must be adapted to the topographical conditions and must be standardized by conducting a trial system. Insect pest, and disease control, (closely linked to the cultivation of healthy seedings), shallow planting cross checking in close spacing, good quantity, periods for dressing

(fertilizer), intermittent irrigation with mid-term drainage most suitable to the Pilot area must be dealt with.

(3) In connection with farm machinery (especially, power tillers) which is presently introduced and rice cultivation, criteria must be set so as to make a link with the technical system of cultivation to ensure the efficient use of the farm machiner.

IV-4 Farmers' Organization

1. The Contents of the Agreement and Present State of its Progress

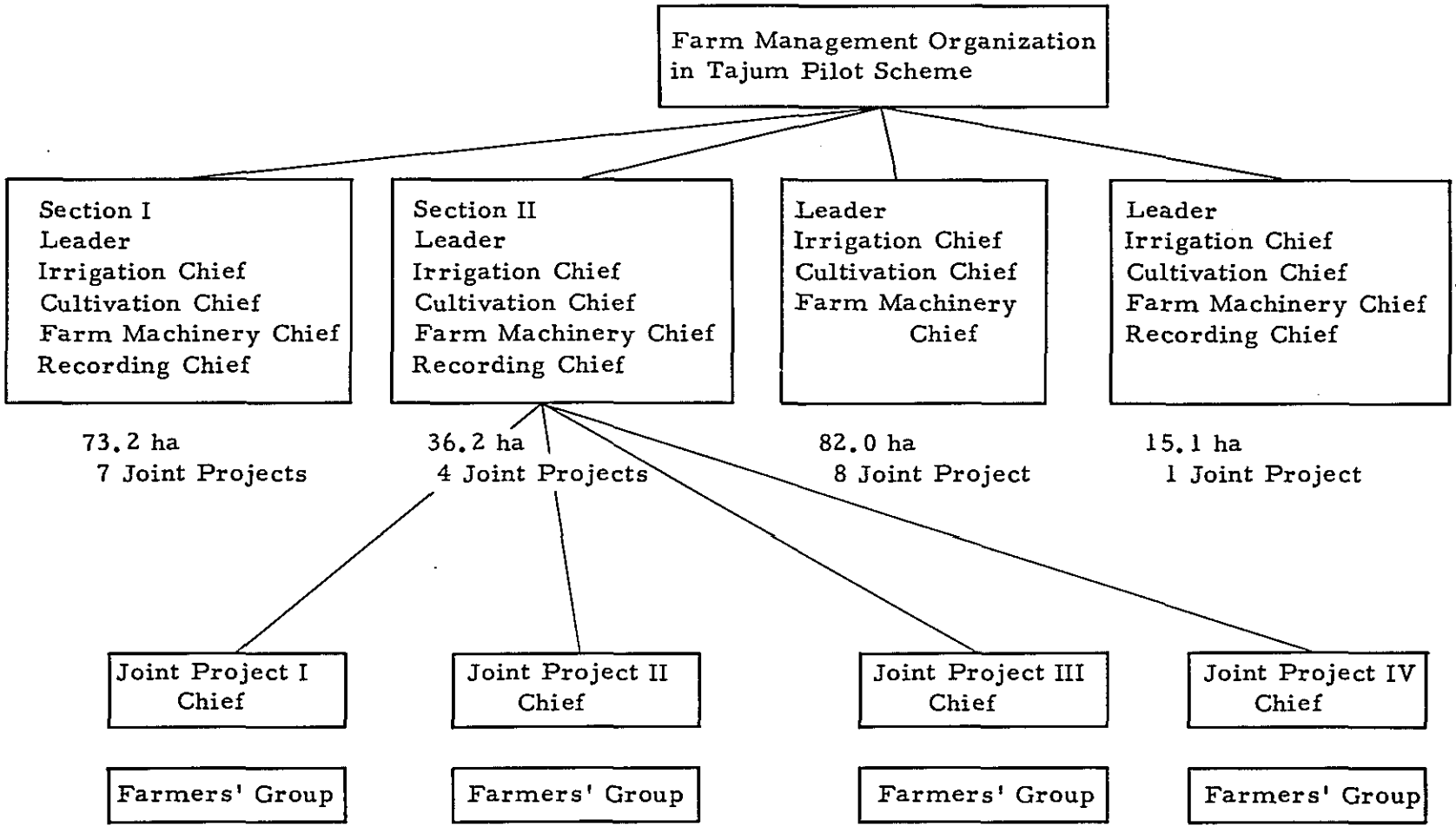
(1) Particulars of Target Set Up

The farmers' organization is described in Article 2, (e) of the Agreement to advise the farmers in the area in connection with the organizations of Farmers' Cooperatives and guidance for their activities in the same area, and also to advise farmers outsides the area in connection with the organization of cooperatives.

The farmers in both Desa Tinggarjaya and Desa Banter are advised in the execution plan of the Pilot Scheme on how to organize agricultural cooperatives and therefore a three-year working plan has been made.

As a result of re-examination of activities made by Japanese Experts despatched to the recipient country, the following aims were set in force:

1) The area under the Pilot Scheme is part of the said two desas, respectively and is too small to be a unit of an agricultural cooperative.
2) According to the conclusion that it is not so easy to foster agricultural cooperatives in Indonesia in view of failures in the past, it has been decided, in this project, to shelve the organization of agricultural cooperatives and to aim at organizing a productive structure for rice production as an infrastructure.



Legend: Each joint work area bout 10 ha.
Each farmers group about 25 pers.

(2) Organization of Joint Cultivation

As an organization of rice production, a joint cultivation system, is scheduled to be organized, and this procedure is now being carried forward to put it into practice as a result of mutual agreement at the *first meeting of the Joint Committee.*

In joint cultivation, the Pilot area of 220 ha. is divided into four sections along each irrigation system and each section is split into Kelempok (Joint working groups) of nearly 10 ha, respectively, 20 kelompoks in total.

In these 20 kelompoks, the following six activities are to be carried out:

(a) To standaridze varieties in each section

(b) To regulate water controls

(c) To standaridze rice planting periods

(d) To rear healthy seedlings in joint nursery beds

(e) To conduct joint fertilizing in each Kolempok at an appropriate period and quantity based on standards of cultivation.

The leaders in joint cultivation consit of 40 members total including 4 leaders and 16 staff members (who are in charge of cultivation, machinery, irrigation and recording) in each section, and 20 leaders in the kelompoks.

In September, 1972, the plotting of the kelompok and election of 40 leaders was already completed, and the organization has been formed as in the following and the leader's general training has been finished at least.

(3) *Organization of Dharma Tirta*

In its working program, guidance for water control is being scheduled to be carried out by organizing agricultural cooperatives. However, in the Central Java, this has to be guided by the so-called "Dharma Tirta", an organization based on the agrarian level (Governor's Notification of the Central Java Province, No. G/03/1971 (4/2/1) and No. 104/1971 (4/2/2) pertaining to the Establishment of the Dharma Tirta in the Central Java Province).

As a result, guidance (for the Dharma Tirta) has been carried out by the "Pilot Center" to promote the formation of the Dharma Tirta; and in February, 1973, the Dharma Tirta was established, which covers a pilot area of 220 ha extending over both Desa Tinggadjaya and Desa Banter.

The organizational system is divided into sections and kelompoks, which are completely overlapped with the system of the aforementioned joint culture.

2. Opinions and Assessment of Farmers' Organizations on the part of Indonesia

Indonesian side assumes the farmers' organization in the said district has been established as a result of the establishment of the Dharta Tirta.

The joint cultivation in appraised by them at its effective measure to execute the BIMAS project and to strengthen the function of the Dharma Tirta, and is recognized as one of the extension systems by Indonesia.

When underprivileged farmers once acquired the skill of the PANCA USAHA, and when enough water is supplied to their own field, there will be no necessity to do joint cultivation, leading to a natural end.

Conversely, also, since water control, during the shortage of water, will naturally be systematized with objects of such a second crop as paddy as the occasion demands, they assume the kelompok of the Dharma Tirta to be the core of the organization, in all respects.

They assume that if these kelompoks carry out, the systematization of joint cultivation and cooperative farming, according to such circumstances as in purchasing and distribution of farm materials, and the guidance of farming, it is important to develope it as an organization to rear healthy development of farmers' cooperatives. (BUUD/KUD).

The aforesaid conception is the one envisaged by the Central Government in February, 1973 and a BUUD has been organized in Tajum covering the Kecamatan Jatilawang including the Pilot area 220 ha.

The Pilot Center is being kept in contact with BUUD to help their

activities by giving preference to members of BUUD for the use of the rice mill of the Center.

The Pilot Scheme is aiming to render the extension service for the whole area of 3,200 ha under the Tajum Irrigation Project and to build a model system of the Dharma Tirta within the Pilot area and also to build a working model of BIMAS program as a main target of the program.

In the aspect of cultivation techniques, Indonesia assumes that the goal of BIMAS has been achieved. However, with regard to the organization itself, since the Pilot area covers only part of both Desa Tinggarjaya and Desa Banter and is still far from being a model of Dharma Tirta which was to be established in one desa as a unit, the goal is not yet fully achieved.

They also believe that it is essential to give more stronger concrete advise to encourage the function of Dharma Tirta in farming activities and to strengthen the close link of the desa with it.

3. Opinions and Assessment of Japanese Experts on Farmers' Organizations

The weak points of Jawa's agriculture lie in the fragmental scale of farm management and in the oversaturated agrarian population.

In order to make improvement in agriculture and to spread techniques under such conditions, there is a necessity to prepare the agrian people to receive the program.

It has been evaluated as an effect of BIMAS Program that the guidance of rice cultivation techniques in the BIMAS program is being conducted, following the system of a demonstration plot and most farmers have come to recognize the effectiveness of fertilizer and to show interest in the application of fetilizers. But on the other hand, many fragmental scale farmers are still left being unable to apply fertilizers for economic reasons.

In view of the sole technical extension service, there is a limit in rendering service through the demonstration plot system, and without agricultural organizations it is difficult to disseminate techniques among those small scale farmers.

In the contents of the Tajum Pilot Scheme, improvement and extension of farm management techniques and the rearing of agricultural cooperatives are included, and also the rearing of agricultural cooperatives is envisaged in its work program.

However, considering that the Pilot area is too small in area to cover 220 ha of the total land extended over the two desas, and that the administrative power (influence) of desa authority is so dominant and although the rearing of agricultural cooperatives is not achievable in such a short period, it can be said that the establishment of a rice production system is quite possible as an infrastructure for future development of agricultural cooperatives. As a result, it aims at establishing a structure of joint cultivation.

The aim of joint cultivation is to evenly raise the farmers' technical level in the Pilot area and at the same time to rationally carry out water control in order to raise land use to a higher level.

The organization of the area is divided into four section based on the water irrigation system and each section is further subdivided into Kelompok covering around 10 ha, including the election of 40 leaders.

The technical guidance training at the Center is conducted with the core of leaders with the farmers acquiring skill through on-the-job practice in rice joint cultivation under the leadership of the group leaders.

Since it is difficult to establish farm management from the beginning by the joint cultivation systems, the group has to begine with the ABC of feasible management trying to reach mutual agreement while having conversation with the farmers, frequently, on every step of the program.

That is to say, although the organization was established on the territorial basis, the practice of collective cultivation has improved the socio-economic conditions of agrarian people, but they are in disagreement over mutual interests, and thus there is little good progress in their activities, particularly, it is difficult to practice joint cultivation in a kelompok where petty farmers are concentrated.

In the 1973 dry-season, 17 kelompoks of 20 succeeded in the joint

nursery beds, and one of the Kelompoks also succeeded in standardization of varieties (Pelita).

If only the seed grains are obtainable, unification of varities is possible all over the area in the next cropping season.

Based on this indispensable conditions of joint cultivation, (1) the unification of varieties, (2) standardization of rice planting periods will be satisfactory, and by attempting perfect matching of family labor within their farm management and by practicing collective cultivation with the advantages claimed for the small scale farm management.

For this purpose, a production system, in the first place, should be formed in each sector on the basis of each desa unit, and an agricultural cooperative should be organized on the basis of several desas or one district, making the production system into an infrastructure.

As mentioned previously, Dharma Tirta is already established as a farmers organization on the basis of one desa. However, if this is organized, not only for water control, but also for an organization to push all activities in farm management, the production system can play an important part in small scale cooperatives, on the basis of one desa.

It is believed that, while continuing with the present program, it is quite adequate to have aimed at setting up a model productive system on the a desa basis, providing a well-organized marketing structure, and at building an organization specialized in such sectors as rice, livestock, and upland field crops, giving assistance in each field of joint cultivation techniques.

4. Evaluation of Farmers' Organization and their Outlook on the Future

Judging from the agricultural conditions of the country, it is considered that the steps, shelving an organization of agricultural cooperatives which was planned first in connection with the organization of farmers associations and guidance/assistance in their activies, and setting a limit to the rearing of rice production structure, namely, rice joint cultivation structure, seems to be a fairly adequate measure.

In other words, since Indonesia has had hard experience in that the greater part of unit community farm cooperatives, more than 40, 000 in its prime days throughout the nation, with about 60, 000 village communities, has substantially broken down during inflation, the Government of Indonesia had been in the stage of wishing to investigate how to rear systematic and general agricultural cooperatives, credit, distribution, technical guidance, processing and marketing services in order to promote BIMAS activities.

There was no agricultural organization of their own in the Pilot area and so it was against the traditional principle of the communal society to form agricultural cooperatives by combining farmers of part of the said two desas. Due to this, it will be extremely difficult to form it in such a short period as three years.

The priority items of the REPELITA-I is to increase foods and the BIMAS program has been running as a definite measure for development.

It is quite natural that the technical guidance in the Pilot area should go along the line of the set policy.

Viewed from this standpaint, it can be evaluated that, in the Pilot area, the BIMAS program is enjoying a successful result in increased food production, aiming at technical dissemination of crop cultivation.

With regard to the collective cultivation structure itself, there has been found same discrepancy in opinions between Indonesia and the Japanese experts.

That is to say, the Japanese experts consider that the so-called joint cultivation structure is being established separately from Dharma Tirta by way of the allotment of plots and election of leaders.

Also, this is a farmer's organization of their own, and they consider that the said organization can be developed in the future to an agricultural cooperative as the farmers own organization by leading and intensifying their activities.

On the other hand, Indonesia considers that joint cultivation can be evaluated as an efficient-means (in the sense of extension service) for aiding the BIMAS program, but its organization is based on Dharma Tirta and the practice of joint cultivation is one of the activities of Dharma Tirta.

As for the organization of agricultural cooperatives, the conception of BUUD/KUD is being already embodied.

The authority concerned on the Indonesian side intends to strengthen Dharta Tirta as a unit community organization to help farmers by means of guidance and advise on farmers' activities.

At this moment, we, the members of the evaluation team, cannot help admitting that our mutual consent was insufficient in this regard.

At present when the Indonesian Government set in force a landmark for rearing agricultural cooperatives, we do not think that it is reasonable to push forward to the forming of agrarian organization in a different way from the Government policy.

The rearing of agricultural cooperatives has been taken up in the West Java Food Increase Project and a positive approach has been made concretely, and yet there is the necessity to try to reach a mutual agreement again between Indonesia and the Japanese experts on how to rear agrarian organization.

Since there is only a short period left before the expiry of the agreement term, and, granting that the term is extended, there is little likelihood of a long extension, and there is call to have mutual consent on the scope of cooperation to be shared by the experts, making clear the first line of work.

The evaluation team considers that, during the remaining period of the agreement and the extension term, the Pilot Scheme should be propelled along the line of the present policy taken up by the Indonesian Government.

In other words, it is considered reasonable that guidance and advice on the future agricultural organization is to be given in the direction of the definite activities of Dharma Tirta in both Desa Tinggarjaya and Desa Banter to promote and strengthen the activities of the existing BUUD of Jatilawang, and that a model organization is to be effectively reared, making it a peripheral unit structure.

In this case, although the present Pilot area covers only part of both desas it is necessary to give guidance and advice for Dharma Tirta, covering the whole area of the desas.