

資 料

- (1) 合同評価報告書（英文）
- (2) 団長レター（英文）
- (3) 分野別活動実績表
- (4) 終了時評価調査での収集資料
 - ① パイロットファームでの実証展示結果(1991年メインシーズン～1992年メインシーズン)
 - ② 栽培部門出版物リスト
 - ③ フィジー稲作慣行栽培技術体系
 - ④ 稲作改善技術展示（1992年の計画）
 - ⑤ 研修カリキュラムカード（目次：ドラフト段階）
 - ⑥ 米自給に関する貿易・商業大臣発言報道（1991年1月18日Fiji Times）
 - ⑦ 地域別の稲の作付面積、生産量、単収(1991年)
 - ⑧ 第1次産業・協同組合省組織図
- (5) フォローアップ関係
 - フォローアップの討議議事録（R/D）（1993年2月26日）

(1) 合同評価報告書

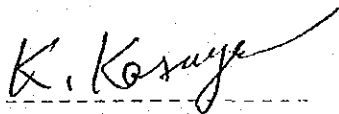
JOINT EVALUATION REPORT
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY IN FIJI

With about five months left until the termination of cooperation period of "the Project of the Improvement of Rice Cultivation Technology" (hereinafter referred to as "the Project") on April 17, 1993 as stated in the Record of Discussions on extension of the period which was signed on March 13, 1990, the Japanese Evaluation Team organized by Japan International Cooperation Agency (hereinafter, referred to as "JICA") and headed by Mr. Kazuo KASUYA, Deputy Director General, Production and Distribution Department, CYUGOKU - SIKOKU Regional Agricultural Administration Office, Ministry of Agriculture, Forestry and Fisheries (MAFF), visited Fiji from November 3 to November 13 with the view to conduct an overall evaluation of the Project together with the Fiji Evaluation Team headed by Mr. Sant Kumar, Acting Director of Extension Division, Ministry of Primary Industries, Forestry and Cooperatives.

The team conducted interviews with Japanese experts and their Fiji counterpart personnel assigned to the Project, had a series of discussions with Fiji authorities concerned, made field surveys and exchanged views among themselves.

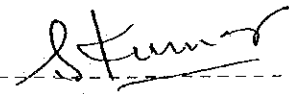
As a result, both sides agreed to forward to their respective Governments the summary of the evaluation referred to in the document attached herewith.

November 11, 1992
Suva, Fiji



Mr. Kazuo KASUYA

Leader,
Japanese Evaluation Team
Japan International
Cooperation Agency



Mr. Sant Kumar

Leader,
Fiji Evaluation Team
Ministry of Primary
Industries, Forestry
and Cooperatives

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I. INTRODUCTION

(1st Stage ---- Before Extension)

Rice has been one of the main food crops in Fiji, but about half of the consumption has been imported. The government policy of Fiji in DP8 was to be self sufficient in rice. However, to meet this target, there were constraints of resources to improve rice production. Under this background, Government of Fiji requested the project type technical cooperation to Government of Japan.

The Project started from April, 1985 based on the Record of Discussions (hereinafter referred as the "R/D") signed on April 18, 1985 for the purpose of development of suitable rice cultivation technology in Fiji.

During the implementation period, there were some changes such as increasing Japanese experts on revised R/D (on July, 1988), and the first evaluation was carried out on October, 1989. As a result of this evaluation, it was recommended that the Project would continue for three years from April, 1990, with emphasis placed on consolidation of existing practical on-farm trials and demonstrations and further development of extension and training programs.

(2nd Stage ---- After Extension)

From April 18, 1990, based upon the new R/D signed on March 13th, 1990, the Project was extended for three (3) years to improve rice cultivation technology with strengthening of applied research, extension and training activities in Fiji. The Project mainly has been carried out at KORONIVIA Research Station and four (4) pilot farms. Targets of extension period as mentioned in new R/D above, are as follows:

- (1) To strengthen technical capability of counterpart personnel in the field of research, extension and training;

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(2) To develop technical manuals on cultivation, field extension and training;

(3) To increase productivity of rice cultivation in pilot farm areas;

Note : Four (4) pilot farms are located at VUSUYA, NAVUA (in VITI LEVU), KOROKADI and TABIA (in VANUA LEVU)

II. EVALUATION OF THE PROJECT

1. PURPOSE OF THE EVALUATION

(1) To make a comprehensive evaluation on the achievement of the Project including implementing activities.

(2) To make recommendation to the authorities concerned of both Governments on the measures to be taken after the evaluation.

(3) To feedback the results of the evaluation for the improvement of the other technical cooperation projects.

2. METHOD OF THE EVALUATION

(1) Evaluation study was conducted by the Joint Evaluation Team (hereinafter referred to as "the Team") consisting of the Japanese Team and the Fiji Team.

(2) The Project for three (3) years extension was evaluated, because original project for five (5) years has already been evaluated at the first evaluation.

(3) Evaluation item of cooperation field was based on R/D and Tentative Schedule of Implementation (hereinafter referred to as "TSI"), and the Team grasped the performance of the project.

(4) Evaluation studies was carried out by means of investigation of the project site (including the four (4) pilot farms) and interview with personnel concerned.

3. EVALUATION ITEMS

(1) Input of Supporting Project

1) Contribution of the Government of Japan

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- (a) Dispatch of Japanese experts
- (b) Provision of machinery and equipment
- (c) Training of Fiji personnel in Japan
- (d) Supplement of local cost expenditures
- (e) Others

2) Contribution of the Government of the Republic of Fiji

- (a) Provision of land, buildings and facilities
- (b) Allocation of budget
- (c) Assignment of counterpart personnel and other personnel

(2) Project Activities

1) Research Activities

- (a) Agronomy
- (b) Agricultural Machinery

2) Verification and Synthesis of Cultivation Techniques

3) Extension

4) Training

5) Others

(3) Impact of the Project

- 1) Impact on Counterpart personnel
- 2) Impact on Implementation Institution
- 3) Impact on pilot farm area

(4) Management of the Project

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4. MEMBERS OF JOINT EVALUATION TEAM

4.1. THE JAPANESE EVALUATION TEAM

Name	Assignment
Mr. Kazuo KASUYA	Team leader
Mrs. Kimiko ISHIKAWA	Rice Cultivation (Agronomy, Agricultural Machinery)
Mr. Mitsuru HAGIWARA	Extension and Training Program
Ms. Tomoko MIYAKE	Effect on Technical Cooperation
Mr. Masayoshi INUZUKA	Evaluation on Technical Planning

4.2. THE FIJI EVALUATION TEAM

Name	Assignment
Mr. Sant Kumar	Team Leader and Extension
Mr. Hari Dutt Sharma	Rice Production
Mr. Jagat Singh	Research and Administration
Mr. Elike Turagakula	Research

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5. SCHEDULE OF THE EVALUATION

(From 4 November, 1992 to 12 November, 1992)

Date	Place	Activities
4/Nov. (Wed.)	Suva	Establishment of Joint Evaluation Team
	Nausori	Survey at main Project office (at KRS)
	Vusuya	Survey at pilot farm
	Navua	- ditto -
5/Nov. (Thu.)	Labasa	Courtesy call on MPIFC Labasa
	Korokadi	Survey at pilot farm
6/Nov. (Fri.)	Tabia	- ditto -
7/Nov. (Sat.)	Suva	Internal Meeting
8/Nov. (Sun.)	-ditto-	- ditto -
9/Nov. (Mon.)	Nausori	Meeting with Counterpart Personnel (at KRS)
		Meeting of Joint Evaluation Team
10/Nov. (Tue.)	-ditto-	- ditto -
		Working for Report
11/Nov. (Wed.)	-ditto-	- ditto -
		Signature of Joint Evaluation Report (at MPIFC)
12/Nov. (Thu.)	Suva	Report to Joint Committee on the Project (at MPIFC)

(Note) KRS : Koronivia Research Station

MPIFC : Ministry of Primary Industries, Forestry and
Cooperatives

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III. RESULT OF EVALUATION

1. INPUT OF SUPPORTING PROJECT

1.1. CONTRIBUTION OF THE GOVERNMENT OF JAPAN

1.1.1. Dispatch of Japanese experts

Nine (9) long-term experts specified in the R/D has been dispatched. In addition, eleven (11) short-term experts in nine (9) fields were dispatched when necessity arose. The total cost of the aspects were approximately 378 million yen (estimated F\$ 4.5 million). Detail of the dispatched experts are shown in Appendix 1 and 2.

1.1.2. Provision of machinery and equipment

The total amounts of machinery and equipment provided by Japan from 1990 to 1992 has a value of approximately 78.8 million yen (Estimated F\$ 0.6 million). Most of them have been utilized effectively in accordance with the objectives of the Project and they are well maintained. Main machinery and equipment are shown in Appendix 3.

1.1.3. Training of Fiji personnel in Japan

Seven (7) Fiji counterpart personnel concerned of the Project visited Japan for training and observation from 1990 to 1992. Details of training are shown in Appendix 4.

1.1.4. Supplement of local cost expenditures

JICA has taken special measures to supplement the local cost expenditures from 1990 to 1992.

(1) Under the Middle Level Technicians Training Program, several training of rice cultivation technology has been implemented mainly to extension officers for the purpose of the transfer of developed technology to farmers. About nine (9) million yen has been spent for conducting these trainings from 1990 to 1992 (including budget of training course scheduled before the end of cooperation period).

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(2) Under the Emergency Countermeasure Program, about 1.1 million yen was spent for constructing the garage for agricultural machinery at Koronivia Research Station in 1990.

(3) Under the Demonstration and Extension Program, about 3.6 million yen has been spent for field demonstrations of developed cultivation technology at four (4) pilot farms from 1991 to 1992 (including budget of implementing demonstration in 1992).

(4) Under the Pilot Infrastructure Construction Program, about 53 million yen has been spent for constructing training facilities at Dreketi and improving two (2) pilot farms in 1990. Tabia pilot farm covers 9.7 ha paddy fields with pump irrigation and 8.3 ha paddy fields were improved at Korokadi.

(5) In addition, budget of conducting seminar in Fiji and information & propaganda of technology have been planned for 1992.

1.1.5. Others

(1) Under the Appropriate Technology Development Program in internal support program, budget allocated was approximately 2.6 million yen and axial-flow thresher was developed in 1990.

(2) The other local cost supporting from 1990 to 1992 has been spent about 19 million yen for constructing warehouse and installing plant at KRS and so on.

(3) Three (3) Japanese Missions were dispatched for the effective implementation of the Project from 1990 to 1992 as shown in Appendix 5. (excluding this evaluation mission)

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1. 2. CONTRIBUTION OF THE GOVERNMENT OF THE REPUBLIC OF
FIJI

1. 2. 1. Provision of Land, Buildings and Facilities.

The Government of the Republic of Fiji has provided necessary land, buildings and facilities for the implementation of the Project.

1. 2. 2. Allocation of budget

The government of the republic of Fiji has allocated total of 495 thousand F\$ for running the Project such as fuel for vehicles and machinery and internal travel allowance of counterpart personnel from 1990 to 1992.

1. 2. 3. Assignment of counterpart and other personnel

Total of eighteen (18) counterpart personnel have been assigned to the Project by the Government of the Republic of Fiji. The details of them are shown in Appendix 6

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2. PROJECT ACTIVITIES

2.1. RESEARCH ACTIVITIES

2.1.1 AGRONOMY

The settled subjects in TSI of extended three (3) years project (1990-1993)

- (1) Selection of suitable varieties
- (2) Improvement of cultivation method
- (3) Improvement of fertilizer application method

To perform the above mentioned items effectively within three (3) years, Agronomy Section of the Project had carried out the survey on farmers and reconfirmation of developed techniques in past five (5) years, the strategy of improvement of rice cultivation technique was made with counterpart personnel.

(1) Selection of suitable varieties

The three (3) high yielding varieties such as Uttam, Deepak and Nui Nui (19815) were selected in the past five (5) years, and the research over the extended three (3) years has been concentrated on the selection of suitable varieties for Northern Division.

Experiments and field trials were carried out at the Koronivia Research Station, and two (2) pilot farms such as Korokadi and Tabia.

According to the results, the local varieties such as China Motka, Ujarka Motka and Takuram showed better growth and higher paddy yield in problem soils such as acidity and/or micro-elements deficiency field mostly in Red and Yellow colored soil which spreads in Northern Division and some part of Central Division.

(2) Improvement of cultivation technique

In improvement of cultivation technique, the following important items were taken up which were

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clarified as problems and defects through survey on farmers as mentioned above.

- 1) Direct seeding cultivation method:
 - (a) Main field preparation method
 - (b) Seeding rate / seeding density
 - (c) Seeding method
 - (d) Water management just after the seeding
 - (e) Water management in middle and latter growth stage.
- 2) Transplanting cultivation method:
 - (a) Nursery method
 - (b) Transplanting method
 - (c) Planting density
 - (d) Seedling number per hill
 - (e) Planting depth
 - (f) Water management and main-field management

In item 1), the main paddy field preparation practice, specially levelling field surface in direct seeding culture has strong influenced on seed germination and seedling establishment percentage and finally paddy yield. It has also been observed that the field levelling is the important point on rice cultivation in Fiji.

The suitable seed rate / seedling density were clarified with 50-60 kg/ha by drum-seeder, and line seeding method has become clear to be far advantageous compared with broadcasting seeding method.

The water management in conventional method is never to apply water up to 4-5 or more leaf stage, and it was observed that many big cracks on field surface occurred. To avoid this disadvantageous points, following points were clarified, a) intermittent irrigation method during seedling establishment stage is the best way to economize

irrigation water as well as improving the effect of 1st nitrogen top-dressing, b) in effective tillering stage shallow water such as 2-3 cm in depth should be kept for encouraging tiller outbreak, c) intermittent irrigation in Middle Growth Stage can avoid inter-node elongation, d) deep water from the beginning of Reduction Division to 10 days after Heading is recommended.

The main field management is reconfirmed as follows;

Suitable weed control method were reconfirmed with Basagran and MCPA in first and second application respectively.

In item 2), suitable nursery method, nursery bed area, seed rate, seed pre-treatment, nursery duration were clarified.

As for the transplanting method, it was clarified that line transplanting method can obtain higher paddy yield than conventional random transplanting method.

The suitable planting density were clarified in different nitrogen levels, soil conditions as well as cultivation seasons.

Suitable seedling number and planting depth were clarified such as 4-6 seedling per hill and shallow planting can encourage paddy yield respectively.

Shallow water in tillering stage and intermittent irrigation method in Middle Growth Stage encourages tiller outbreak and avoids lodging respectively.

And, field management is just same as mentioned above.

(3) Improvement of fertilizer application

Clarified problems through survey of farmers cultivation method as shown below;

1) Three (3) fertilizer elements and application method

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- 2) Nitrogen level
- 3) Nitrogen split application method
- 4) Nitrogen application method
- 5) Nitrogen top-dressing time at Panicle Formation Stage
- 6) Improvement of soil acidity
- 7) Solving method of micro-elements problem

Application practice of three(3) fertilizer elements is not common in farmers field, but it was recommended that 40 and 30 kg/ha of phosphate and potassium by elements can obtain higher paddy yield respectively, and all layer application method was also recommended.

Suitable nitrogen levels were clarified in different soil conditions, with local and modern varieties.

In split application method, suitable split applications were clarified in transplanting and direct seeding methods in different planting seasons.

The nitrogen application method in transplanting method can be recommended as all layer application method, and incorporation of the 1st nitrogen top-dressing in the direct seeding method.

Suitable time of nitrogen application at Panicle Formation Stage in different varieties were clarified to obtain maximum spikelets number per unit area without any deterioration of dry-matter production structure.

The problem soils (such as acidic soils) are deficient in micro-elements. About 40-60% of paddy fields in Central and more than 80% in Northern Division it were observed. Against these problems, it was clarified that application of 1.5-2.0 t/ha of lime powder, sulfur and boron can improve the soil conditions.

The micro-elements deficiency and acidic soil problems especially in the Northern Division will be required trial continuously.

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2.1.2 AGRICULTURAL MACHINERY

Improvement of Mechanical Method is a subject which is written in TSI of extended three(3) years project.

Soon after the project was extended, field surveys were conducted to understand cultivation systems, labor requirements, and mechanization levels in each area, and activity plan was made so that the activities could be carried out effectively and efficiently.

According to the above activity plan, improvement of partial technologies of following working stages have been tried.

- 1) Land preparation
- 2) Sowing and Transplanting
- 3) Weed control
- 4) Harvesting
- 5) Threshing and Cleaning

As a result, the following have been achieved.

- 1) Development of animal-drawn leveller
- 2) Assessment of manual transplanter
- 3) Assessment of drum seeder
- 4) Development of drum type drill seeder
- 5) Assessment of manual weeder
- 6) Investigation of optimum harvesting time
- 7) Development of axial-flow thresher

According to the field surveys, the developed technologies and the recommended cultivation methods, four(4) types of working programs have been made, considering the regional differences.

Rice cultivation mechanization manual was made, which

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provides a guideline of powered machinery such as tractors, self-propelled machines and implements, when the problems arise.

Also a chapter of harvesting and post-harvesting operations in the Rice Cultivation Manual has been written, introducing developed technologies.

2. 2. VERIFICATION AND SYNTHESIS OF CULTIVATION TECHNIQUES

2. 2. 1. Reconfirmation of appropriate techniques and synthesis on irrigated and rain-fed paddy field

Established partial techniques through various experiments were reconfirmed at four (4) pilot farms. These reconfirmed partial techniques were synthesized as a "Rice Cultivation in Calendar" in 1991.

At the same time of synthesis of partial established techniques, compilation of Rice Cultivation Manual was performed including drum-seeder and hand weeder.

2. 2. 2. Economical evaluation of established technique

Advantages of improved cultivation techniques which were established in IRCTP were confirmed economically, but there are still some socio-economic problems on rice production.

2. 2. 3. Publication of "Rice Cultivation Manual"

Preparation of technical guide book entitled "Rice Cultivation Manual" will be completed at the end of March, 1993.

2.3 EXTENSION

2.3.1. Demonstration of the improved technology and improvement of its method at pilot farms

(1) Demonstration fields has been settled in four (4) pilot farms, and selected technologies from the recommendations of agronomy and machinery sections were demonstrated, which may be adequate for each area.

(2) In Vusuya and Calia pilot farms, comparative demonstrations of Drum seeder and Broadcasting method were conducted, and the possibility of the utilization of Drum seeder was verified.

Also, it was intended to improve farmers' skills of judgment and improvement of field levelling and soil hardness required for sowing.

(3) In Korokadi and Tabia pilot farms, comparative demonstration of line transplanting and random transplanting were conducted, and the advantage of line transplanting was verified.

(4) It was shown to farmers in all areas that the optimum time of operation and adequate methods can certainly increase the yield.

(5) Field training of farmers' practices were conducted in each demonstration field at important management stages.

2.3.2. Improvement of field extension activities.

(1) The counterpart personnel and the expert have been carrying out the activities according to the plan.

(e.g. making the weekly extension implementation plan)

As the result of this arrangement, the counterpart personnel has begun to work as planned.

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The counterpart personnel would urge the extension officers to establish the annual implementation plan of extension activities.

(2) The counterpart personnel would recommend to make the concrete guidance plan to the extension officers by grasping the farmers' intentions.

The management of pilot farms would be carried out under consensus of the farmers, the local extension officers and counterpart personnel.

(3) The counterpart personnel has realized the need to guide the extension officers before the farmers.

(4) The counterpart personnel has been trying to change the method of farmers' training, by emphasizing more of field practical training rather than confining to lectures only. The extension officer has identified the effectiveness of this training.

(5) The main technical standard or input materials which are obtained from IRCTP has been used for the extension activities. Also the extension officers would modify those standards according to the local conditions.

When necessary, the counterpart personnel would collect the extension officers and the farmers in order to observe the model cultivation practice on the new techniques at the KRS.

2.3.3. Preparation of field extension materials including the extension manual

(1) Extension activity manual is being prepared which explains the organized extension activity and methods, based on the experiences of the expert and counterpart personnel, on actual field conditions.

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(2) Enough educational slides (2,500 slides) were prepared and additional slides are being prepared occasionally as a discussion and training materials for counterpart personnel and the extension officers.

(3) Two (2) educational video tapes, "The Golden Grain of Fiji" and "Farmer training at Korokadi and Tabia" were produced.

(4) In future, extension materials (slides, posters, samples etc.) will be developed by counterpart personnel.

(5) Counterpart personnel has acquired the techniques of material preparation which is necessary for a study of extension activity.

2.4 Training

2.4.1. Improvement of curriculum

(1) To grasp the existing extension activity through observing, surveying of the present extension activity, and discussing with the extension officers.

(2) Following the above activities, to consult with the D&I staff about the necessary basic capability for extension officers to compile the Training Needs (draft) on necessary skills of basic rice cultivation and extension activities.

2.4.2. Preparation of the training materials including training manual

(1) The necessary capability of rice cultivation, as mentioned above, has been arranged in each working order of rice cultivation by the "Card System" to facilitate curriculum compilation and future training.

(2) Various training materials were developed for each

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course and each training item to facilitate better understanding of trainees.

(3) The training manual has been prepared by the expert and the counterpart personnel.

2.4.3. Implementation of training

TSI shows the following courses,

- 1) Basic Training
- 2) Advanced Training
- 3) Key Farmers' Training
- 4) Seminar/Workshop

At the Joint Committee meeting which was held in January 1992, it was agreed that in addition to the short-term training, the long-term training should be implemented.

The key farmers' training was eliminated because it should be carried out by extension staff themselves.

(1) Long-term training

The long-term training for the extension officers is conducted for six months. the purpose of this training is to gain necessary skills and attitudes by themselves through experience of all cultivation works from sowing to harvesting.

The first training was conducted involving four (4) personnel, which was very effective and successful. In the second training (on-going) the number of trainees doubled.

(2) Short-term Training

Three (3) short-term trainings of 5 days each were conducted and a total of thirty-six (36) trainees participated.

The purpose of the training is to be recognize the necessity of judging and formulating future plans to improve methods and procedures of activities.

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(3) Workshop

One (1) workshop was held involving ten (10) participants to identify training needs.

(4) Seminar

Two (2) seminars were conducted. Thirty (30) participants attended the first seminar in which the short-term expert, Mr. Yoshikawa, lectured on soil analysis and fertilization for Northern pilot farms. At the second seminar, of fifty (50) participants, the short term expert, Prof. Ito, lectured on mechanization of rice cultivation.

The long and the short-term trainings will be evaluated at the Workshop to be held in November, 1992.

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3. IMPACT OF THE PROJECT

The Project makes it clear that there is the possibility to increase the rice productivity in Fiji through the technical development. The Team confirms that the linkage of research, extension, and training on rice cultivation are important and necessary, and these skills of activities have been transferred to Fiji personnel.

The achievement of the Project is expected to affect the rice cultivation in Fiji in the future.

3.1. IMPACT ON COUNTERPART PERSONNEL

Counterpart personnel have acquired the capabilities on the project activities. They have recognized the importance of the system which is connected with each field; namely research, extension, and training. They have recognized that the activities of research, extension, training for extension officers and modification of the machinery should be synthetically planned and carried out in order to make it more useful for the farmers.

3.2. IMPACT ON IMPLEMENTATION INSTITUTION

The authorities concerned have recognized the importance and necessity of the following :

- (1) To harmonize the values of the extension activities among the related Divisions.
- (2) To identify the needs of the training for the extension officers.

The workshop is planned to be held, in which the authorities in Extension Division, Research Division, and Drainage and Irrigation Division will collaborate in order to discuss the issues on rice cultivation technology, the needs of the training and so on. It is expected that the meeting will strengthen the cooperation of these three(3) Divisions.

The implementation institutions have realized that the skills are essential for the activities of the extension

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officers.

3.3. IMPACT ON PILOT FARM AREA

Besides KRS, four (4) pilot farms (Navua, Vusuya, Korokadi, Tabia) are practically utilized for obtaining good results and transferring new ideas and techniques to farmers within the pilot farms.

The technology developed at the KRS was verified at each pilot farm, and the maximum yield obtained was around 6.57 t/ha. The farmers in and around pilot farms are recognizing the necessity of adopting the improved technology.

The knowledge and the skills on the machinery utilization have been strengthened in the pilot farms. Especially, performance of axial-flow thresher developed in the Project was admired by the farmers and the agricultural machinery manufacturers, and they are demanding to put the thresher on the market. The performance of the thresher is being made known from the pilot farms to the regional area.

The trainings have been well received by the personnel involved. The long term skill training for the extension officers is highly evaluated by authorities involved and trainees themselves. These training would provide the necessary practical experience of rice cultivation at the KRS paddy fields. Therefore, trainees would smoothly understand, and will be able to transfer the skills to their farmers. Participants of the training have been increasing not only from the MPIFC but also from the Rewa Rice Limited. The short-term training on the attitude and skills of extension activities are also taking effect.

4. MANAGEMENT OF THE PROJECT

4.1. ORGANIZATIONS OF INSTITUTIONS

The Project has been managed mainly by the Joint Committee based upon three (3) Divisions of MPIFC such as Research Division, Extension Division and Drainage and

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Irrigation Division. The Project was conducted by implementation unit composed of Research Station and pilot farms.

4.2. JOINT COMMITTEE

The Joint Committee meetings were held five times from 1990 to 1992. The Committee formulated the Annual Work Plan of the Project and reviewed the overall progress of the achievements of the Annual Work Plan.

Under the Joint Committee, the rice technical committee was established, which was responsible to formulate the annual technical development plans, and confirmed the improved technology for demonstrations.

Committee meetings held from 1990 to 1992

Joint Committee

21 Aug. 1990

28 Feb. 1991

6 Jun. 1991

10 Jan. 1992

14 Oct. 1992

Technical Committee

22 Oct. 1990

24 May 1991

3 Feb. 1992

16 Mar. 1992

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IV. CONCLUSION AND RECOMMENDATION

1. The activities of the Project have been conducted in accordance with the items mentioned in the TSI with the efforts of Japanese and Fiji personnel concerned.

The Project has accomplished most of the objectives.

Counterpart personnel concerned have acquired the capabilities on each field of this Project activities.

2. On the termination of the cooperation by 17 April, 1993, the Project will complete all the activities planned, including the publication of the manuals.

The manuals mentioned above will be utilized in order to conduct activities on research, extension and training by the Fiji authorities concerned.

3. After the end of the cooperation, training and extension activities on farm level should be continued until rice harvesting of main season, 1993. Therefore, it is necessary to carry out a follow up cooperation until August, 1993, on the following fields :

(1) Training and Coordination (Management)

(2) Extension

4. A few years after the end of the cooperation, if necessary, the post evaluation survey would be conducted.

5. The needs for further development of agricultural mechanization was recognized by both teams, and dispatch of an expert in this field was proposed by Fiji authorities concerned.

APPENDIX 1
LIST OF JAPANESE EXPERTS

(Long-Term Experts)

	Name	Assignment	Period
1	Yasuki FUJITA	Leader	05/08/1990 - 25/08/1991
2	Hiroshi TAKEUCHI	Leader	07/10/1991 - 17/04/1993
3	Yasumasa OIZUMI	Coordinator	22/04/1990 - 17/04/1993
4	Teruhisa NAMBA	Agronomy	22/04/1990 - 17/04/1993
5	Ikuo YAMAMOTO	Agricultural Machinery	(12/05/1989) - 17/04/1993
6	Tomoe SATO	Agricultural Extension	29/04/1990 - 27/04/1992
7	Toshio HIRATSUKA	Agricultural Extension	20/04/1992 - 19/04/1993
8	Kunihiro MASUMI	Training	(26/07/1985) - 17/04/1991
9	Sousuke HAGA	Training	28/04/1991 - 07/04/1993

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APPENDIX 2

(Short-Term Experts)

	Name	Assignment	Period
1	Nobutaka ITO	Farm Machinery	05/08/1991 - 02/09/1991
2	Ryuuichi MASUBUCHI	Farm Management	22/07/1990 - 20/08/1990
3	Fukumatsu SUZUKI	Farm Management	15/12/1990 - 13/01/1991
4	Kouichi UMEMURA	Agricultural Extension	27/02/1992 - 23/03/1992
5	Yasuki FUJITA	Extension Planning	29/04/1990 - 10/05/1990
6	Setsuko ANMA	Agricultural Extension on Improvement of Working	08/01/1992 - 06/02/1992
7	Shigehiko YOSHIKAWA	Soil and Fertilizer	08/04/1991 - 06/06/1991
8	Kiyotada HAYASHI	Economical Evaluation on Improved Rice Technology	09/09/1992 - 19/10/1992
9	Akira IWAMOTO	Supervising	(18/03/1990) - 28/07/1990
10	Isao MUKAI	Supervising	30/06/1990 - 29/12/1990
11	Katsuhiko KUROSAWA	Mechanical Engineering	08/01/1992 - 02/02/1992

Cost of Experts (Long-Term and Short-Term)

(Thousand Yen)

Japanese Fiscal Year	1990	1991	1992 Estimate	Total
Cost	164,298	113,025	100,360	377,683

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APPENDIX 3

LIST OF MAIN MACHINERY AND EQUIPMENT PROVIDED BY JAPAN

	Main Equipment	Amounts (thousand yen)
1990	Pump for Irrigation Station Wagon (3) Power Tiller (5) Electric Balance (4)	23,245
1991	Minibus (1) Audio-Visual Text for Extension Video Camera and Deck (2) Spare Parts of Machinery and Equipment	26,895
1992	Printing Machine Forklift Engine for Training Audio-Visual Text for Extension	27,764 (Estimate)
Total		77,904

APPENDIX 4

LIST OF COUNTERPART PERSONNEL TRAINED IN JAPAN

Name	Training Field	Period
Jag Ram	Rice Production	25/09/1990-26/12/1990
Nemani Valucava Buresova	Rice Cultivation	23/06/1991-06/07/1991
Bal Naiker Krishna	Farm Mechanization	02/03/1992-20/11/1992
Anare Namatalaba Macedru	Rural Sociology	19/01/1992-21/04/1992
Jagat Singh	Rice Production	02/08/1992-24/08/1992
Samisoni Ulitu	Rice Production	06/08/1992-24/08/1992
Parmesh Chand Nath	Agricultural Extension	21/06/1992 -12/10/1992

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APPENDIX 5

DISPATCHED JAPANESE TEAM

Kind of Team	Number of Member	Period
Long term survey (Implementation survey)	3	05/03/1990 - 15/03/1990
Technical guidance	4	20/02/1991 - 03/03/1991
Long term survey	1	06/07/1992 - 12/07/1992
(Evaluation)	(5)	(02/11/1992-14/11/1992)

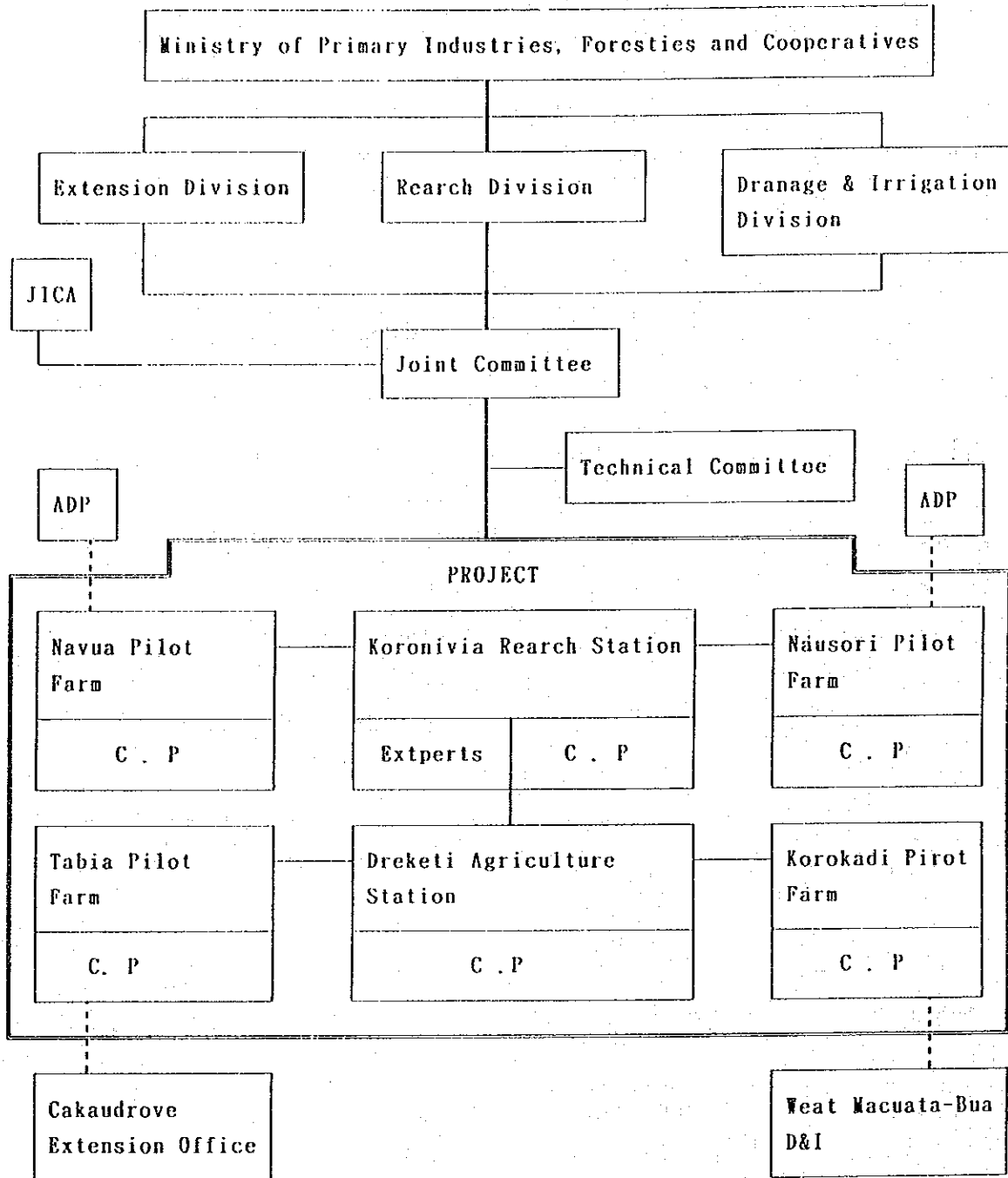
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APPENDIX 6

LIST OF FIJI COUNTERPART PERSONNEL
(Allocation of Fiji counterpart personnel)

Name	Assignment	Period
Nemani Buresova	Project Head	Jul. '90 - Oct. '92
Atunaisa Kaloumaira	- ditto -	Oct. '92 -
R. N. Dove	Project Manager	- Apr. '92
Jagat Singh	- ditto -	Apr. '92 -
Eliki Turagakula	General Counterpart	(Apr. '89) -
Abdul Munaf	Agronomy	(May. '87) -
Bal Krishna	Machinery	(May. '87) -
Isikeli Tuitubou	- ditto -	Feb. '91 -
Anare Macedru	Training	Jan. '90 -
Pramod Sharma	- ditto -	Jan. '92 -
Parmesh Nath	Extension	Oct. '90 -
Suruj Kumar	- ditto -	Apr. '92 - Oct. '92
Samisoni Ulitu	General Counterpart Northern	Apr. '90 -
Ami Chand	Extension (KOROKADI)	Dec. '90 -
Y. P. Sewak	- ditto - (NAVUA)	- ditto -
Raghuwaya	- ditto - (NAUSORI)	- ditto -
Aminisitai Luvuwai	- ditto - (TABIA)	- ditto -

Organization Chart



Note : ---- Dispatch Counterpart and Cooperation Office to Project
 Abbreviation: ADP: Agricultural Development Program
 D&I: Dranage and Irrigation Division
 C. P :Counterpart Pesonnel

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(2) 団長レター

November 12,

Mr. Nemani Buresova
Permanent Secretary
Ministry of Primary Industry,
Forestry and Cooperatives

Dear Sir,

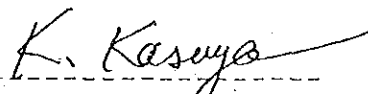
I would like to express hearty thanks for full cooperation of Fiji authorities for evaluation activities. And, it is my pleasure to submit the joint evaluation report of the Improvement of Rice Cultivation Technology Project to respective governments, recognizing that the Project has been successfully implemented.

Succeeding the implementation of the Project during past two years and seven months, I hope successful achievement of the targets within remaining term.

I wish the necessary procedures will be taken to sustain the outputs of the Project, especially emphasizing systematization of extension activities and reinforcement of training instructors for extension officers.

I think mutual understanding and friendship had been constructed through the implementation of this Project. I am expecting further development of cooperation and mutual understanding between Fiji and Japan.

Your's Respectfully,



Kazuo KASUYA
Team Leader,
Japanese Evaluation Team
Japan International
Cooperation Agency

C. C. : Mr. Y. Hori : Ambassador of Japan
Mr. H. Ito : Resident Representative, JICA
Mr. H. Takeuchi : Japanese Team Leader, IRCTP/JICA

(3) 分野別活動実績表

① 栽培

フィジー稲作研究開発計画・第二フェーズ(1990年4月～93年4月)・活動実績表

(栽培部門)	分野	事項	内容	容	成果
1. 研究	1. 研究・試験設計 (1) 過去5か年間(85-90)の成果の整理と再確認 (業務開始の予備活動)	1. 過去5か年間に各種研究、圃場試験がKRS試験圃場およびパイロット圃場で実施されたが、それ等の結果の内直ぐ改良栽培技術合成に役立つと思われる個別技術についてカウンタパートと共に再確認する作業を行った。 2. この再確認作業は、栽培、土壌肥料および普及部門の中間報告および最終報告書により実施した(栽培部'90/91年度年次報告書 pp.2-6 参照)。	1. R/D 延長直後に調査を実施し、農家慣行栽培技術の現状と問題点を明らかにすると共に、第二フェーズの技術改善/開発の方向を明確にした(栽培部'90/91年度年次報告書 pp.6-8 参照)。 2. この調査結果から、想定される好適水稻栽培技術を策定した('90/91年度、年次報告書 pp.10-14 参照)。 3. 他方、不良水田土壌の多くがNorthern Divisionに集中していることから、同地域の土壌と地上部乾物生産量調査を実施した(土壌/乾物生産調査報告書参照)	1. R/D の項目の内、品種の選定、育苗法、施肥法等の試験が実施されているが、最も重要と想定される窒素施肥技術、殺菌剤等々の試験が今迄完了していないと判断された。 2. 現在、フィジーに於いては、Central Divisionでは圃場栽培法、Northern Divisionでは移植栽培法が一般的であるが、IRCTP での試験研究は移植栽培法のみが取り上げられ、圃場栽培法の試験研究結果は皆無であるところであった。他方、On-farm レベルの地域/現地実証試験も実施されていない。 3. また、農家慣行栽培技術・収量調査は皆無であり、これを実施し確実な改善指針/戦略を策定する必要がある。	1. 農家調査の結果、Central Divisionの圃場栽培法では、本田準備法(特に均平作業)、播種法/均一播種、播種量、窒素量/窒素分施肥法、雑草防除、水管理法等の問題がある事を明らかにした。 2. Northern Divisionの移植栽培法では、本田準備法、窒素量/分施肥法、移植法/栽培密度、育苗法、水管理法、土壌率に増収阻害要因がある事を明らかにした。 3. 以上の結果から、次項に示した改善項目/試験項目を設定した。
1. 研究	(3) 第二フェーズの業務活動計画の策定	1. 延長された3か年では、特にOn-farm レベルでの試験を目的としているが、時間的に非常に短く、効果的/効果的な活動計画の策定が不可欠である事から、これを実施した。	1. 効果的な活動を展開する為に、栽培法別(地域別)に以下の重要項目を取り上げた。 圃場栽培法: 本田準備法、播種量/播種法(均一播種)、播種密度、窒素量/分施肥法、水管理法、本田管理法、酸性および微量要素欠乏水田の改善法。 移植栽培法: 本田準備法、播種量/育苗法、育苗期間、栽培密度、一株苗木数、移植深度、窒素量/分施肥法、移植後水管理法、酸性および微量要素欠乏水	1. 効果的な活動を展開する為に、栽培法別(地域別)に以下の重要項目を取り上げた。 圃場栽培法: 本田準備法、播種量/播種法(均一播種)、播種密度、窒素量/分施肥法、水管理法、本田管理法、酸性および微量要素欠乏水田の改善法。 移植栽培法: 本田準備法、播種量/育苗法、育苗期間、栽培密度、一株苗木数、移植深度、窒素量/分施肥法、移植後水管理法、酸性および微量要素欠乏水	1. 効果的な活動を展開する為に、栽培法別(地域別)に以下の重要項目を取り上げた。 圃場栽培法: 本田準備法、播種量/播種法(均一播種)、播種密度、窒素量/分施肥法、水管理法、本田管理法、酸性および微量要素欠乏水田の改善法。 移植栽培法: 本田準備法、播種量/育苗法、育苗期間、栽培密度、一株苗木数、移植深度、窒素量/分施肥法、移植後水管理法、酸性および微量要素欠乏水

分野	専 項	内 容	成 果
1. 研究 (続き)	2. 選 品種の選定。	2. 3ヶ年計画に従い90年 Off-Season の詳細試験設計を実施した。	田の改善法。 2. 栽培技術項目のうち、重要度の高いものから選び、その詳細圃場試験計画の策定を実施した。
	2. 選 品種の選定。	2. Northern Division を対象とした選品種の選定。	1. Northern Division を対象とした選品種選定のため、先ず IBS試験圃場での多収性および慣行品種の生育特性、窒素施肥反応試験等を実施した。
		(1) IBS 試験圃場での品種特性調査 (2) Korokadi, Tabiaでの品種適応試験 (総計 91. Off-season 計 pp17-30)	2. 土壌/地上部乾燥物生産調査結果から、赤色土/黄色土あるいは酸性土壌水田では慣行品種である China Korika Ujaruka Korikaあるいは Takuran品種等が、多収性品種である Deepak, Urtam, Nui Nuiよりも顕著な生育と共に高い収量を得られる事を明らかにした。
			3. 他方、Northern Division では後述要養欠乏水田が多く、この様な欠陥土壌に対して、も、上述した慣行品種の方が遙かに強い抵抗性と高い収量を獲得する事を明らかにした。
3. 移植栽培法の改善	3. 移植栽培法改善のための実証試験 【重要項目】 移植栽培法 1) 育苗法 2) 移植法 3) 栽植密度 4) 一株苗本数 5) 移植深度 6) 水管理 7) 本田管理法	3. 移植栽培法改善のための実証試験 【重要項目】 移植栽培法 1) 育苗法 2) 移植法 3) 栽植密度 4) 一株苗本数 5) 移植深度 6) 水管理 7) 本田管理法	【移植栽培法】 1. 育苗法：育苗の最も重要な点は、苗代面積、播種量、種子量、育苗期間等であるが、苗代面積は本田面積の1/20-1/25、種子量は本田 1ha当り50kgおよび育苗期間は、Off-Seasonでは30日、Main-Seasonでは20-21日が最適期間であること等を明らかにした。 2. 移植法：移植法は、現行のランダム移植よりライン移植で収量が高くなる事が明らかになった。これは、ライン移植により生育中期～後期の稲の光合成能力の向上によるものであり、他方面場の全てがライン移植により均一な稲生育環境となる事によるものである。 3. 栽植密度：栽植密度は、土壌条件、窒素施肥量あるいは作期により変える必要があり、沖積土で肥沃度の高い水田あるいは窒素量80kg/haでは㎡当たり25-30株、中程度の肥沃度では30-35株/㎡、Northern Divisionの非常に硬質な水田では35-40株/㎡の栽植密度が適当である事を明らかにした。 4. 一株苗本数：上述した栽植密度では、一株苗本数が4-6本で株内競合も起きず、高い収量を獲得する事を明らかにした。 5. 移植深度：移植深度は、浅植えで旺盛な分げつ発生が認められ、極力浅植えの励行が増収に繋がる事を明らかにした。 6. 水管理：移植栽培の場合、田植え直後から最高分けつまでの水管理が収量に最も影響し、特に有効分けつ期の流水灌漑が分けつを促進する事を明らかにした。 他方、生育中期(最高分けつ期～減数分裂直前)の間断灌漑により節間伸長を促さず、
			- 続く -
			- 続く -

分野	事項	内容	結果
I. 研究 栽培 一続き一	4. 直播栽培法の改善	<p>4. 直播栽培法改善のための実証試験</p> <p>【重要項目】</p> <p>直播栽培法</p> <p>本田準備法</p> <p>種子量/播種密度</p> <p>播種法</p> <p>播種直後水管理</p> <p>分けつ期およびそれ以後の水管理</p> <p>本田管理</p>	<p>倒伏防止に効果があることが明らかとなった。</p> <p>7. 本田管理：雑草防除は、BasaganおよびDCPAによりヒニを除く雑草防除が可能であることを再確認した。虫害防除は、トビイロウンカはOrthene、タテ葉巻にはSevin、アワヨトリにはDicidex で十分な殺虫効果があることを再確認した。</p> <p>[直播栽培法]</p> <p>1. 本田準備法：直播栽培法における本田準備、特に均平作業の良否は発芽/苗立歩合を大きく左右し、ひいては収量にも強い影響を与えることが調査の結果明らかとなった。収量を、圃場の不均一状態に予想した場合、全体の半分が低く、半分が高い圃場の場合は、収量は均平状態に比べて61%の減収となり、低いところが25%あるいは75%の状態では、収量は75%の減収になると予想された。</p> <p>この結果から知られる様に、当圃に於ける水稲栽培上最も大きな問題は「圃場の不均一」であり、この問題を解決しない限り改善稲作技術の普及は有り得ず、ひいては国家的レベルでの増産も不可能であろうと推察され、今後の大きな課題である。</p> <p>2. 播種量/播種密度：播種量は、散播栽培では70kg/ha、ドラム・シーダーでは50～60kg/ha が好適播種量であることを明らかにした。農家基本調査によると、最高播種量農家は120kg/haにも達し、普通農家でも80～100kg/haである。農家において播種量が多い原因の第一は圃場の不均一であり、次いで分けつ期に整業を施用しないことが原因である。</p> <p>3. 播種法：農家調査結果では、殆どのCentral Divi. の農家は散播直播栽培法であるが、この栽培法は株間競争を激しくし、光合成能力の低下とともに日射が個体群群落の下部に透過しにくく、軟弱腰の稲となり生育後期の倒伏を助長することを明らかにした。そして、ドラム・シーダーによるライン直播と散播の収量比較試験では、農家の圃場でOff-Seasonにライン播種法で77%、Main-SeasonでのKRSに於いても72%の増収となり、温田直播では散播法よりもライン直播法が遥かに高い収量を獲得できる事を明らかにした。</p> <p>4. 播種直後水管理：直播栽培法の播種直後の水管理は、稲が3-5葉期に成るまで灌漑しないのが一般的で、このため田面には大きな亀裂が入り、次に灌漑する場合に相当量の灌漑水が必要となり、この時期に施用する整業肥も流亡する割合が高いものと推察される。上述した様に、圃場均平状態が非常に悪い状態で直播栽培法が行われている現状では、投入資材のロスも大きく、それに見合う収量を得る事は不可能である。</p> <p>5. 分けつ期およびそれ以後の水管理：上述したが、散播直播栽培法では個体群選擇構造</p>

分野	事項	内容	成果
1. 研究 — 統一	5. 施肥法の改善	<p>5. 移植/直播栽培の肥料施肥法の改善</p> <p>【重点項目】</p> <ol style="list-style-type: none"> 1) 肥料三要素施用量および施用法 2) 窒素施用量 3) 窒素分施肥法 (直播/移植) 4) 窒素施用法 (窒素の土中投入) 5) 幼穂形成期の窒素施用時期 6) 酸性土壌矯正法 7) 微量要素施用 	<p>内への光の入射が低下するために生育中・後期に茎の弱い稲となり殆どの圃場で倒伏が観察される。それを防止する意味でも、生育中期 (最高分けつ期～減数分裂直前) の間断灌溉を行うことにより倒伏が軽減される事を明らかにした。</p> <p>6. 本田管理：雑草防除および病虫予防除は、上述した移植栽培法と同様の管理でよい。</p>
— 統一	— 統一	— 統一	<ol style="list-style-type: none"> 1. 肥料三要素施用量および施用法 農家基本調査によると、Central Divisionでは、一部の農家を除き磷酸・加里施用は一般的でなく、Northern Divisionでは施用農家割合は一層低く、全体的に窒素のみでの稲作栽培であることが明らかとなった。この事から、窒素施用量は次項に述べるが、磷酸・加里は成分量で各々40kg、30kg/haの施用で高い収量を得られる事を再確認した。他方、農家調査によると、一部の農家で磷酸/加里肥料を均平作業後あるいは追肥として施用した農家が見られ、磷酸・加里および移植栽培法の窒素基肥は必ず全層施用の助行が望ましい。何故なら当国では、Main, Off-Seasonを通じて雨が多く流亡も激しい事による。 2. 窒素施用量 窒素施用量は、土壌条件あるいは品種によって施用量を増減する必要があり、プロシエクトで選抜された Nui Nui, Urtam および Deepak 品種の場合、沖積土壌水田では成分量でha当り40～60kg、普通土壌で60～80kg及び赤色土/黄色土では80～90kgが好適量であることを明らかにした。 他方、慣行品種である Thakur Ram, New Guniea, China Korka あるいは Ujarka Korka 等では、上述した窒素の50～60% が適当である事を明らかにした。 3. 窒素分施肥法 直播および移植栽培法では、上述した窒素量を以下に示した分施肥法により最高収量を得られる事を明らかにした。
— 統一	— 統一	— 統一	<p>【直播法】</p> <p>基肥：磷酸・加里の全量を耕起前あるいは代かき前に施用し、全層施肥とする (窒素は施用しない)。</p> <p>一回目追肥：全窒素量の35% を葉令 3-4葉に施用。</p> <p>二回目追肥：全窒素量の35% を葉令 5-6葉に施用。</p> <p>三回目追肥： 30% を穂首分化期～減数分裂直前の間に施用。</p> <p>【移植法】</p>

分野	専 項	内 容	成 果
		<p>(一続き一)</p> <p>5. 移植/直播栽培の肥料施肥法の改善</p> <p>【重点項目】</p> <ol style="list-style-type: none"> 1) 肥料三要素施用量および施肥法 2) 窒素施用量 3) 窒素分施肥法(直播/移植) 4) 窒素施肥法(窒素の土中混入) 5) 幼穂形成期の好適窒素施用時期 6) 酸性土壌矯正法 7) 微量要素欠乏水田の改善策 	<p>基 肥：全窒素量の50%及び磷酸・加里の全量を全層施肥</p> <p>一回目追肥：全窒素量の25%を活着直後(移植後7-10日後)に施用</p> <p>二回目追肥：残り25%を穂首分化期～減数分裂期直前の間に施用</p> <p>4. 窒素施用法(特に第一回目窒素追肥の土中混入について)</p> <p>上述したが、農家圃場では窒素・磷酸・加里共に表層施肥法が一般的であり、当圃場の多い状況ではその流亡は激しく、極力全層施肥法の励行が効果が高い。</p> <p>そこで、当圃場で収量を最も強く影響を及ぼしている単位面積当り窒素の確保をより効率的にするために、第一回目窒素の除草機による土中混入による効果を検討したところ、移植栽培では混入区が無混入に比べて平均で31%、直播法では24%増収し、窒素混入効果が高い事を明らかにした。他方、除草効果もあることから、今後の普及が待たれる。</p> <p>5. 幼穂形成期の窒素施用時期</p> <p>幼穂形成期の窒素追肥は、単位面積当り穎花数(穎数)増加に顕著な効果があるが、その反面個体群落構造の悪化を招き易く、細心の注意を払う必要がある。</p> <p>IRS 試験圃場の土壌条件では、出穂前28～20日に追肥する事により、群落構造の悪化もなく効果的に穎花数の増加を促進させられる事が明らかとなった。尚、Off-Seasonでの葉面積指数は5.5m²/㎡前後で最高収量を獲得し、それ以上でも以下でも減収の傾向を示した。</p> <p>6. 酸性土壌矯正法</p> <p>土壌調査結果、Central Divisionでは全水田面積の約40-60%、Northern Divisionはその約80%が酸性土壌であると推定される。この酸性土壌水田は赤色土/黄色土で多く散見され、これらの酸性土壌はpH 4.0～4.7(ICI)の範囲にあり、窒素などを施用してもその効果が顕著に現れない(収収が阻害される)。これに対し、ライムパウダーをha当り1.5-2.0t施用する事で生育の改善、増収に効果がある事を明らかにした。</p> <p>7. 微量要素欠乏水田の改善策</p> <p>上述した赤色土/黄色土で特に顕著な微量要素欠乏が観察され、これに対し、硫酸、Boron(硼酸)の施用により、顕著な生育促進効果、増収効果がある事が明らかとなった。施用量は、㎡当り80gの硫酸および0.3-0.5gの硼酸が適当である。</p>

分野	事項	項目	内容	答	成果
II. 実証と技術の合成	1. 栽培技術の実証と組み立て	1-1. XRS での開発栽培技術の試験圃場での再確認/実証	1-1. XRS での開発栽培技術の試験圃場で再確認/実証	1-1. XRS 試験圃場で開発/確立された栽培技術の内、再確認あるいは実証が必要と考えられる項目については、XRS 試験圃場で再度を検討した。	1-1. XRS 試験圃場で開発/確立された栽培技術の内、再確認あるいは実証が必要と考えられる項目については、XRS 試験圃場で再度を検討した。
		1-2. 開発/確立栽培技術のパイロットでの実証	1-2. 開発/確立栽培技術のパイロットでの実証	1-2. XRS での栽培技術の開発/確立と同時平行的に各パイロット圃場 (Calia, Yusuye) では1990年Off-Season、1991年 Main-Seasonの 2回)、Northern Division (Torokadi および Tabia) では1991年Off および Main-Seasonの 2回) で現地実証試験を実施した。	1-2. XRS での栽培技術の開発/確立と同時平行的に各パイロット圃場 (Calia, Yusuye) では1990年Off-Season、1991年 Main-Seasonの 2回)、Northern Division (Torokadi および Tabia) では1991年Off および Main-Seasonの 2回) で現地実証試験を実施した。
		1-3. 開発/実証された技術の合成	1-3. 開発/実証された技術の合成	1-3. 開発/実証された技術の合成	1-3. 開発/実証された技術の合成
	2. 栽培技術の体系化	2-1. 上述した技術の合成と同時に体系化	2-1. 上述した技術の合成と同時に体系化	2-1. 上述した技術の合成と同時に体系化	2-1. 個別技術の合成と同時平行的にドラム・シダー、手押し除草機等を組み合わせた各作期別、栽培法別の栽培体系化を 1991 年 7 月より開始した。
		2-2. 標準水稻栽培体系の確立	2-2. 標準水稻栽培体系の確立	2-2. 標準水稻栽培体系の確立	2-2. 標準水稻栽培体系の確立
		1) Main-Season. 直播栽培法	1) Main-Season. 直播栽培法	1) Main-Season. 直播栽培法	1) Main-Season. 直播栽培法
		2) Off-Season. 直播栽培法	2) Off-Season. 直播栽培法	2) Off-Season. 直播栽培法	2) Off-Season. 直播栽培法
		移種栽培法	移種栽培法	移種栽培法	移種栽培法
	3. 確立技術の経済的評価	3-1. 個別開発/確立技術の経済的評価	3-1. 個別開発/確立技術の経済的評価	3-1. 個別開発/確立技術の経済的評価	3-1. 1992年 9月 9日～10月19日に、林経済評価短期専門家により実施された。
		3-2. 栽培法別、作期別栽培法の経済的評価。	3-2. 栽培法別、作期別栽培法の経済的評価。	3-2. 栽培法別、作期別栽培法の経済的評価。	3-2. 栽培法別、作期別栽培法の経済的評価。
	4. 水稻栽培技術指導書の作成 (Rice Cultivation Manual)	4-1. 原稿執筆 (第一回目)	4-1. 原稿執筆 (第一回目)	4-1. 原稿執筆 (第一回目)	4-1. 水稻栽培技術指導書の原稿執筆は、1992年 4月より開始し、現在第二回目原稿の討議が終了した時点である。最終原稿は1992年12月に完成予定である。
		4-2. 校訂、校正、印刷	4-2. 校訂、校正、印刷	4-2. 校訂、校正、印刷	4-2. 1993年 1月初に印刷を開始し、1-2回のゲラ校正の後、1993年 3月末に完成予定である。

プロジェクト延長後（1990年—1992年）の活動実績

分野	事項	内容	成果
農業機械	1. 調査		
	1) 機械化状況調査	調査表を準備し、コロカンドンディ、タンピア、ラケナ、バ等で5から10戸の農家を調査した。	最も労働時間を費やす作業は、移植栽培に於いては移植作業、直播栽培に於いては収種あるいは除草作業である。収種作業に多くの労働者を使用している。等の事が分かった。
	2) 作業体系調査（作業日誌）	作業日誌の記載をパイロット地域の1-3戸の農家に依頼した。	実際の作業時間配分が把握できた。畜力を一日4時間以上使用することは希だと分かった。
	3) 均平方法調査	ナウソリ、ナブアでの畜力均平の方法を各10戸、調査した。	圃場均平に時間をかけている農家ほど、収量が高いことが分かった。農家で工夫された均平器具もいくつか発見できた。
	2. 部分技術の改善		
	1) 本田準備	畜力作業での慣用ツースハローに代わる回転式ハロー3種類を試作し比較試験した。	回転式ハローにより雑草埋め込み作用が改善されるが、砕土性が充分でない事が分かった。
	均平板の試作	農家の器具や文献を参考に畜力用の均平板を試作した。	ライスウイークに展示し、反響をえた。
	タイラーの試作試験	IRRIで設計された湿田用タイラーを試作した。	エンジン馬力が不足してうまく作動しなかった。製造コストが予想より高くなる事が分かった。
	2) 播種、移植作業		
	人力田植機の導入検討 性能試験、改良	IRRI式人力田植機の改良と性能試験	小改良を加え条件を整えると植え付けミスなしで0.07(ha/hr)の能力を発揮出来る事が分かった。
湛水直播機の導入検討 ドラムシダー-条間比較	IRRI式ドラムシダーの条間隔の比較試験をした。	15, 20, 25, 30, 35cmの条間を比較し、30cmを越えると収量が落ちることが分かった。	
播種法比較	撒播、ドラムシダーによる条播、タコ足播種機による点播を作業能率と収量で比較した。	収量は均一播種の出来る条播と点播が良く、作業能率は点播が他に比して劣ることが分かった。	
ドラムシダー改良	ドラムシダーの作業能率、播度を向上させるための改良を試みた。	土壌硬度が一定な所では、能率、播度の向上ができた。実用化は出来なかった。	

分野	事項	内容	成果
農業機械	乾田播種機の開発	ドラムシダの乾田播種機への応用。 除草機の効果を開るための除草方法比較試験。 日本製除草機を譲りて試作した。	作業幅 1m の畜力用ドラムシダ型ドリルを開発した 移植栽培では無処理に比べて明らかに効果があるが、直条播栽培では有意差がでるほどはつきりしなかった 材料と製作方法に問題があり、充分な機能を発揮しなかった。
	3) 管理作業 人力除草機の導入検討 除草効果比較試験	収穫時期による収差を3品種について調査した。	最高収量を確保できる期間が1週間以下であり、時期を逃すと15-30%収量が落ちることが分かった
	4) 収穫作業 収穫時期の把握	従来型の性能試験を行い、穀粒損失を減らすための改良を試みた。	従来型では、穀粒損失が3-10%と多く、作業人員も4-5名必要とするのが欠点である。コンケープを広くて脱穀ロスの低減を図ったが、効果がなかった。
	5) 脱穀選別作業 既存市販脱穀機の改良	穀粒損失が少なく、従来型より省力的で且つ移動性の良い(軽型)軸流脱穀機の開発。	給流量能率が従来型より劣る(従来型 2.2t/hr、開発機 1.2t/hr)が、穀粒損失 2%以下、軽型で作業人員2-3名の脱穀機が開発された。五台試作し、農家で2シーズン試用して耐久性、適応性も実証された。
	唐箕開発	上記軸流脱穀機に装着でき、単体でも手で操作可能な唐箕の開発。	開発中。
3. 機械化作業体系検討	畜力、トラクタ占有、共有等と栽培法、作期を考慮した作業体系の検討。	地域性を考慮した作業体系を4種類作成した。	
4. マニュアル作成	1) 機械化手引き書	機械導入時に考慮すべき事項(サイズコスト、維持管理等)の解説。	原稿完成。
	2) 稲作マニュアル	収穫及び収穫後作業の解説。 稲作作業体系の例示。	原稿完成。 原稿完成。

プロジェクト延長期間1990(4月) - 1993(4月) 活動実績

④ 農業普及

分野	事項	内容	成果
農業普及	1.カンガラの技能向上 (1)プロジェクト地域の農業社会員の関係調査	経営研修、家族、稲作技術、家庭環境等について のアンケート調査	(1)土地所有形態、耕地面積の把握 (2)栽培方法の把握 (3)農業資機材調達の実態 (4)その他(報告書作成)
	(2)地域社会関係調査	ワダ系、イト系農民の社会組織、土地制度等に関する聞き取り調査	(1)両系農民の行政-住民の連携の把握 (2)土地制度に関する啓蒙性の把握
	(3)稲作実態調査	品種とその特性及び農家の取り組み。品種及び稲作栽培をめぐる課題、ルーフ活動の課題を知るためのインタビュー調査	(1)4つのワダ地区の実態を明らかにし、品種の動向をさぐる。 (2)品種をめぐる現状の課題を検討する。 (3)栽培改善、労働、経済の課題を追究する。 (4)東西活動の実態と見直し検討。 (5)Yiti Levu と Yavua Levu の生産条件、栽培条件、市場性の差と今後の対応。 (6)新技術導入条件の明確化。
	(4)普及計画の樹立と運用	年間計画、月間計画、重点活動計画、その他計画の必要性と様式の検討	単なる増収、増収目標に留まらず普及方法/手段の導入により実質的普及活動改善を期す。
	(5)現場における農民研修	主として4つのワダ地区の展示園を中心に農民が主体的に作業するよう心掛け、現地で必要農民を兼ね、現地PAで、その都度の必要な技能研修を、実習を主体として行う。	1991年 7月及び10月 Yusuva 9月 Nausori 高校 1992年 9月 Korokadi及びTabia 10月 Navua およびNausori
			爾後継続予定

プロジェクト延長期間1990(4月) - 1993(4月) 活動実績

分野	事項	内容	成果
	<p>2普及フェアの作成</p> <p>3.4.10.17.7.4 における稲生産力の増大</p>	<p>緊迫性の高い内容を、経験や当月の普及活動実態目下フェアが、所結成のもとに、カブネットとともにをもとにして作成し、今後の普及活動に役立てる執筆中</p> <p>4.10.17.7.4 地域でつくられ各々に展示面を設置し、当該活動の普及拠点とする。</p> <p>奨励品種の導入 栽培改善技術の導入、普及 展示面を利用しての農民研修 展示結果の活用</p>	<p>展示結果は4.10.17.7.4 内の取置よりすぐれた結果が得られた。</p> <p>(2)周辺農家への普及の拠点として役立つ</p> <p>(3)展示面活動を通じて農民とのコミュニケーションがよくなる。</p>

1990-1992年活動実績

分野	事項		実施場所	F. Y1990 A Y J J A S O N D J F F V A Y J J A S O N D J F F W A M J J A S O N D J F F X A K J J A S	F. Y1991 A Y J J A S O N D J F F V A Y J J A S O N D J F F W A M J J A S O N D J F F X A K J J A S	F. Y1992 A Y J J A S O N D J F F V A Y J J A S O N D J F F W A M J J A S O N D J F F X A K J J A S	FY1998 A Y J J A S O N D J F F V A Y J J A S O N D J F F W A M J J A S O N D J F F X A K J J A S
	R/Dの項目	具体的項目					
農業普及	1、現場における技術向上	現地及び農民の実情調査 普及計画の樹立運用 普及員の連携活動	現地/現地調査 KRS, ADP 現地	---	---	---	---
	- 現地普及活動の改善	現場における農民研修 普及部門(短期)への協力	現地 KRS	---	---	---	---
	- 普及教材の準備	集団の育成と強化 普及教材の作成 普及手段/方法の利用	現地 KRS, 現地 パイロット	---	---	---	---
	2、普及マニュアルの開発	マニュアル作成のための準備 マニュアルコミティでの検討	現地 KRS, 現地	---	---	---	---
	3、パイロットにおける稲生産力の増大	パイロットに地域及び稲作の実態調査 パイロット4地域における展示面の設置及び運営	現地 パイロット	---	---	---	---
	- 主としてパイロットにおける改善技術の展示(TSI-3)	Field Day, National Rice Week 等 パイロットにおける技術の展示		---	---	---	---

プロジェクト延長期間1990(4月) - 1993(4月) 活動実績

④ 研 究

分野	事項	内容	成果
研修	1.カリキュラム作成 1-1 研修活動のシナリオと研修マニュアルの研修に対する要望、普及活動の現地調査など、普及活動担当者(7-7)との討議	1-1 からの目標設定と、業務分析による研修項目の設定、同配列	1-1の中で普及活動の現況としてまとめた。
	1-2カリキュラムの作成	1-1からの目標設定と、業務分析による研修項目の設定、同配列	実施した研修の経過から基礎研修と普及活動の一部のカリキュラムを作成した。
	2.研修方法の転換 2-1 各種研修資料作成 (a)研修カリキュラム (b)稲作研修各種関連資料 (c)稲作実験マニュアル	講義や室内中心から実習中心、現場中心とする。	ほららに技能や態度の形成を置いたが、その目標は達せられずと考えられる。ただし、その結果が具現されるためには、時間を要する。
	2-2 研修マニュアル	カリキュラムにもとづく研修の企画、実施、運営のしかたについてまとめる。	カリキュラムにもとづく研修の企画、実施、運営のしかたが実施した研修のすすめ方を改善しつつ作成した。
	3.研修の実施 3-1 稲作基礎長期研修	1.作期を通して、合宿、実習により技能態度を体験させる。	1.作期を通して、合宿、実習により技能態度を体験させることができた。
3-2 普及活動短期研修	普及活動の計画的進め方について、問題解決と行事の進め方を取り上げる。	集団討議、思考により、要因分析、課題整理と、問題解決思考の手順を研修した。	
3-3Deno Farmの利用等	設置だけでなく、利用を研修として実施する。	農民対象の研修はしないことになったので、尻切れとんぼになった。	
3-4セミナー、ワークショップ、調査報告	短期専門家の課題により実施する。	7月-朝の課題に対する関心の程度により異なった。	
3-5 研修報告書の作成	各研修終了後報告書を作成する。	カリキュラムにより実施状況はちがうが、一応作成している。	

(4) ① パイロットファームでの実証展示結果

(1991年メインシーズン～1992年メインシーズン)

(参考) パイロットファームの収穫実績 (単収)

年 (シーズン別)	ナブア (カリ)	ナウソリ (アサ)	コロカندی	タンピア
1989年m/s平均 (メインシーズン)	<u>3.00 t/ha</u>	<u>1.47 t/ha</u>		
1989年o/s平均 (オフシーズン)	<u>3.01</u>	作付けなし		
1990年m/s平均	<u>3.00</u>	<u>2.40</u>		
1990年o/s平均	<u>3.00</u>	作付けなし		
1991年m/s平均 実証圃場	<u>2.92</u> 播種法 品種 トラクタ - Uttam トラクタ - Nuinui 直播 Uttam	<u>1.43</u> 播種法 品種 3.5 直播 Nuinui 3.2 直播 Deepak 2.5 直播	<u>2.30 t/ha</u> 播種法 品種 3.2 条植 Uttam 4.0 ばら撒き Uttam 3.2 条植 Nuinui 3.7、6.6 ばら撒き Nuinui 3.3 条植 Thakuram 3.2 ばら撒き Takuram	<u>3.20 t/ha</u> 播種法 品種 4.04 条植 Nuinui
1991年o/s平均 実証圃場	<u>3.50</u> 播種法 品種 トラクタ - Nuinui 直播 Nuinui	<u>2.45</u> 播種法 品種 トラクタ - Nuinui 5.35 直播 Nuinui 5.30 直播	<u>2.71</u> 播種法 品種 6.56 条植 Nuinui 5.70 ばら撒き Nuinui	<u>3.55</u>
1992年m/s平均 実証圃場	<u>3.33</u> 播種法 品種 トラクタ - Nuinui 直播 Nuinui	<u>2.42</u> 播種法 4.04 トラクタ - (MPI) 4.47 トラクタ - (IRCTP)	<u>2.25</u> 播種法 品種 4.34 Nuinui 4.60 Thakur 5.22	<u>4.84</u>
1992年o/s平均	集計中 2.88 (トラクタ -) 3.48 (直播)	刈り取り中 (アサ以上の収穫見込み)		

② 栽培部門の出版物リスト

1. 慣行農家水稲栽培技術の問題点と改善の方向
2. 1990/91 年・年次報告書
3. 1991年、上半期 (1991, Main-Season) 報告書
4. 1991年、下半期 (1991, Off-Season) 報告書
5. 1992年上半期 (1992年 Main-Season) 報告書
6. 研究／普及合同協議会発表報告書
7. 栽培部、第二フェーズ・中間自己評価報告書
8. 均平作業の重要性と異なる圃場均平状態が収量・収量構成要素に及ぼす影響について
9. Northern Division の土壌と地上部乾物生産量の相関関係に関する報告
10. 稲栽培の基礎知識 (訓練マニュアル)
- * 11. フィジー稲作研究開発計画、栽培部・第二フェーズ総合報告書 (原稿)
- * 12. “水稲栽培技術書” (原稿)

星印 (*)については、現在原稿準備中であり、本プロジェクトが終了する時点で印刷を完了するものとする。

③ フィジー稲作慣行栽培技術体系

フィジーでは、地域によって様々な耕種法による稲作が行われているが、下記に示す体系表は昨年五月から六月にかけて行った調査に基づき、パイロット地域の標準的作業体系をまとめたものである。聞き取り調査であるので、作業時間、作期は信頼性に欠けるものがあるので作業日誌による詳しいデータ収集を試みている。尚、ナウソリ（ブスヤ）についてはフィジアンのマタンガリであり慣行の標準的体系を持っていないので割愛した。

1、コロカンディ地区作業体系表（灌漑田、一部二期作）（ha当り）

月・日	作業名	使用資材その他	使用機械など	作業時間 (時)	作業人員 (人)	延作業時間 (時)
雨期作（乾期作7-11）						
12上— 1中	育苗	種子 China motoka 水苗代、成苗育苗 (乾期作種子：takurram)	牛2頭、プラウ、 ツースハロー	16	1	16
12中	耕起	プラウ耕1回	〃	42	1	42
01上—下	耕起代かき	プラウ耕2回+ハロー3回	〃	76	1	76
〃	均平	ハロー背面利用		9	1	9
〃	移植	ランダム		59	4	236
	施肥	根をリン酸溶液に浸す P ₂ O ₅ :150kg		0		
	除草 防除			0		
05上—下	刈り取り		鎌	37	4	148
	脱穀		牛2頭	30	3	90
	選別	自然風選		6	3	18
	乾燥	天日		30	2	60
	運搬		牛2頭+そり	4	2	8

計 103

2、タンビア地区作業体系表（天水田）（ha当り）

月・日	作業名	使用資材その他	使用機械など	作業時間	作業人員	延作業時間
				(時)	(人)	(時)
12上ー 1中	育苗	種子 China motoka 丘苗代、成苗育苗	牛2頭、プラウ、 ツースハロー	15	1	15
12中	耕起	プラウ耕1回	"	41	1	41
01上ー下	耕起代かき	プラウ耕2回+ハロー3回	"	89	1	89
"	均平	ハロー背面利用	"	25	1	25
"	移植 施肥	ランダム		84 0	4	336
05上ー下	除草 防除 刈り取り		鎌	0 0 50		
	脱穀		脱穀機	15	4	60
	選別	自然風選		20	3	60
	乾燥	天日		30	3	90
	運搬		牛2頭+そり	8	3	24

計 940

3、ナブア（カリア）地区作業体系表（灌漑田、二期作、基盤整備済）（ha当り）

月・日	作業名	使用資材その他	使用機械など	作業時間	作業人員	延作業時間
				(時)	(人)	(時)
雨期作（乾期作7-11） 12	耕起	ロータリー1回	トラクター	4	1	4
01上ー下	耕起代かき	ロータリー1回	"	4	1	4
"	均平	ハロー+角材	牛2頭+ツースハロー 角材	4	1	4
"	播種	湛水撒播 種子 uttam, deepak		8	1	8
	元肥	P:50kg K:50kg		8	1	8
	除草	MCPA+Propanil	噴霧器	8	1	8
	追肥	N:25kg 三週後 N:25kg 幼穂形成期		8 8	1 1	8 8
04上ー下	防除 刈り取り	セビン	噴霧器 リーパー	8 4	1 1	8 4
	脱穀		脱穀機	10	6	60
	選別	自然風選		25	2	50
	乾燥	天日		50	2	100
	運搬		牛2頭+そり、トラック	5	2	10

計 284

④ 稲作改善技術展示 (1992 年の計画)

1992 Main Season Demonstration program

Name of Pilot Farm	Subject	Detail of Demonstration Technology	No. of Demonstration Farm	Notes
Korokadi コロカディ	Improvement of fertilization by using compost. Demonstration of improved machines.	1, Compost; 10t/ha 2, Variety; nuinui+traditional 3, Planting density; 30-40 hills/m ² 4, Row and scatter transplant 5, Fertilizer application N; 30 kg/ha P; 30 " K; 30 " P, K → basal N; application *1st ; 50% 3-4 weeks *2nd ; 50% P.I stage 6, Using portable axial flow thresher and hand weeder.	Main 1 Sub 2	Field leveling must be done with care.
Tabia タビヤ	Improvement of fertilization by using compost. Demonstration of improved machines.	1, Compost; 10t/ha 2, Variety; nuinui+traditional 3, Planting density; 30-40 hills/m ² 4, line transplanting 5, Fertilizer application N; 20 kg/ha P; 20 " K; 20 " P, K → basal N; application *1st ; 50% 3-4 weeks *2nd ; 50% P.I stage 6, Using portable axial flow thresher and hand weeder.	Main 1 Sub 1	Field leveling must be done with care.

<p>Callia A~07</p>	<p>Uniformity of broadcasting.</p> <p>Improvement of fertilizer application on broadcasting.</p> <p>Demonstration of improved machines.</p>	<p>1, Using of drum seeder 2, Quantity of seed ; 50-70 kg /ha 3, Fertilization system trail 1 N; 57.5 kg/ha P; 25 kg/ha P, K K; 75 kg/ha basal trail 2 N; 50 kg/ha P; 40 kg/ha P, K K; 30 kg/ha basal N; Application method a) 2 times *1st 3 weeks *2nd P.1 Stage b) 3 times *1st 30-35% 3-4 leaves *2nd 30-35% 5-7 " *3rd 30-40% 20-30days before heading 4, Using portable axial flow thresher and hand weeder.</p>	<p>Main 1</p> <p>Sub 2</p>	<p>Field leveling must be done with care.</p> <p>Using of improved variety = nuinui</p>
<p>Vusuya 7~17</p>	<p>Uniformity of broadcasting.</p> <p>Demonstration of transplant</p> <p>Demonstration of improved machines.</p>	<p>1, Using of drum seeder 2, Variety; NUINUI 3, Quantity of seed ; 50-70 kg /ha 4, Fertilization system trial 1 N; 57.5 kg/ha P; 25 kg/ha P, K K; 75 kg/ha basal trail 2 N; 50 kg/ha P; 40 kg/ha P, K K; 30 kg/ha basal N; Application method a) 2 times *1st 3 weeks *2nd P.1 Stage b) 3 times *1st 30-35% 3-4 leaves *2nd 30-35% 5-7 " *3rd 30-40% 20-30days before heading 5, Using portable axial flow thresher and hand weeder.</p>	<p>Main 1</p> <p>Sub 1</p>	<p>Field leveling must be done with care.</p>

⑤ 研修カリキュラムカード (目次: ドラフト段階)

LIST OF THE CURRICULUM CARD
for BASIC RICE TRAINING (DRAFT)

- 1, Land Preparation-(1) Cleaning of Surroundings (Bund Mowing, Creak Cleaning)
(2) Confirmation of Field Size
(3) Design of small Project for developing the Appropriate Technology
(4) Flooding Water (Rainfed and Irrigation)
(5) Ploughing & Harrowing
(6) Fertilizer Application (Basal Dose---All-layer Applying)
(7) Puddling & Leveling
- 2, Seed Preparation-(8) Variety Choice & its Combination
(9) Calculation of Seed Quantity needed
(10) Seed Separation & Germination Test
(11) Seed Pretreatment (Disinfection, Soak & Incubation)
- 3, Fertilizer Preparation-(12) Planning Fertilizer Application (including Making Compost)

- 4, Raising Seedling-(13) Calculation of Nursery-Bed Size needed
(14) Making Nursery-Bed
(15) Taking care of the Seedling
- 5, Direct Sowing -(16) Drill Seeding on Upland
(17) Broadcast & Drum Seeding on Wetland
(18) Gap-filling
- 6, Transplanting -(19) Pulling the Seedlings out
(20) Transplanting (Random & Regular)
- 7, Rooting & effective Tilling Stage -(21) Water Level Control depending on Rain & Irrig. (Weather Data)
(22) Topdressing for Tillering
(23) Weed Control on Upland & Wetland
(24) Insects & Disease Control by the Chemicals
- 8, Invalid Tilling Stage -(25) Mid-season Drainage
(26) Intermittent Irrigation
- 9, P / I Stage -(27) Topdressing for Panicle Initiation
- 10, Heading (Flowering) Stage-(28) Flooding Water for Flowering

フィジーの国内新聞 "THE FIJI TIMES" (1992年1月18日より抜粋)

(商業省 プニボボ大臣の Rice Week に際してのコメント)

Self-sufficiency not sustainable: Vunibobo

THE concept of self sufficiency is no longer sustainable in many countries, says the Minister for Trade and Commerce Berenado Vunibobo.

And he said the challenge was to strengthen our economic capability to enable the country to import quality and cheaper food from anywhere in the world.

Mr Vunibobo was speaking at a function to mark Rice Week at Nabull Village in the Rewa Delta yesterday.

"Government's desire to make us self sufficient in rice is motivated by several reasons," Mr Vunibobo said.

"One is the hope that we will save foreign exchange and secondly the need for food security.

But "rice is only one item in the basic food requirement of the country

"At the end of the day, the determinant is not merely whether we can produce rice in the quantity and quality required, but also at prices which the consumers can afford."

He said the self sufficiency policy

saw rice farmers being protected from outside competition.

But over 20 years have passed since the rice industry began, he said.

"It is now time to allow the industry to stand on its own feet without direct government support and without protection.

"For this reason, by 1994, license control will have been removed from rice imports."

"Government will continue to reduce the direct assistance that is given to paddy farmers although research on new rice varieties and extension work will continue so as to help growers improve efficiency, yields and output.

Rather than trying to assist the country achieve rice self sufficiency, Mr Vunibobo said farmers should now make their own decisions about what they plant and how much they plant.

"If you can compete with imported rice, as many rice growers can, and if you are happy with the money that you earn from selling your rice, then by all means continue growing rice."

"Government drainage, roading,

extension work and advice will continue to be offered to help you to compete," he said.

On rice farming at Nabull, the Trade and Commerce Minister said the area has benefitted from government assistance in many ways.

"Machines have been provided for land clearing, making over 250 hectares of land available for agricultural use.

"Drainage work has been carried out on the Rewa Delta providing the water and drains necessary for the cultivation of rice and other crops.

"Training has been provided at Nadave and extension staff of the Ministry of Primary Industries have been giving advice on paddy growing methods," he said.

About 500 people were at Nabull yesterday which was one of a number of centres that observed National Rice Week activities.

Mr Vunibobo was accompanied by a number of government officials including the Commissioner Central Taniela Tabu and the Deputy Secretary for Primary Industries Nemanu Buresova.

⑦ 地域別の稲の作付面積、生産量、単収（1991年）

Rice Area, Production and Yield (1991)

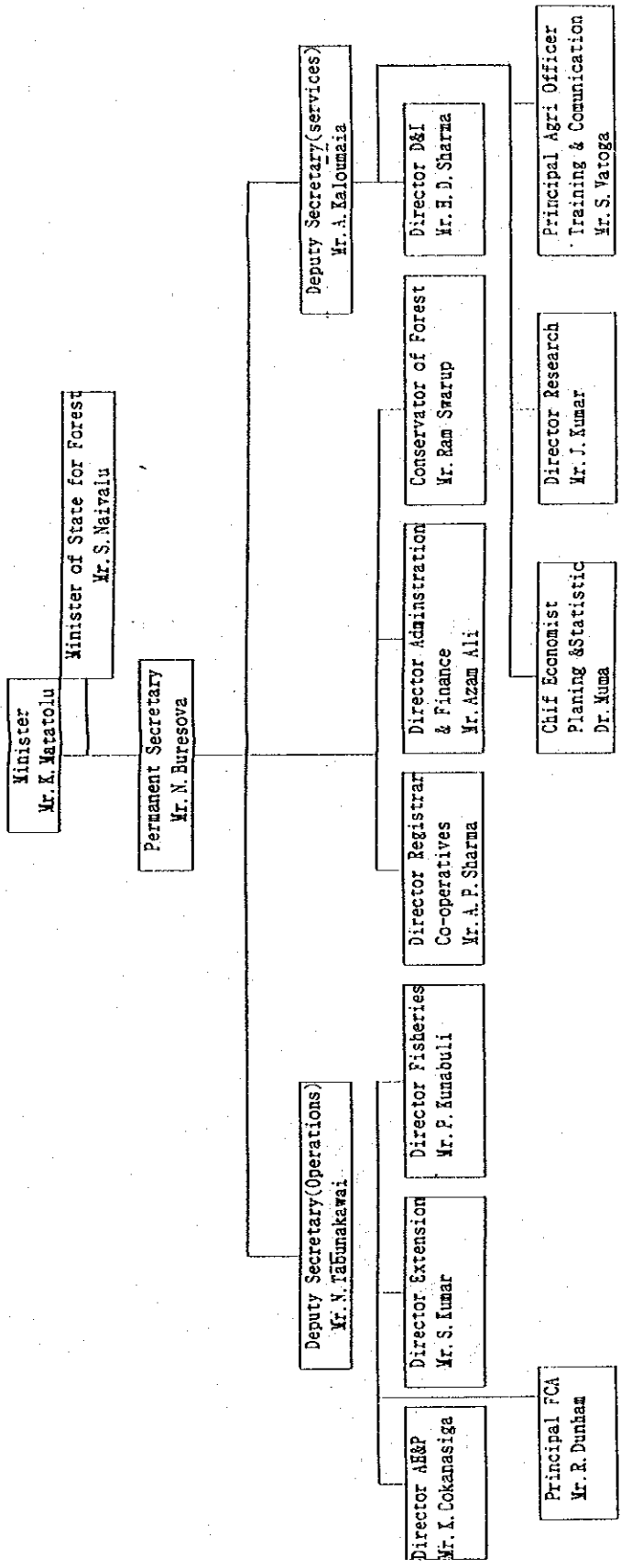
DIVISION	AREA PLANTED (Ha)			PADDY PRODUCTION (t)			AVERAGE YIELD(t/Ha)		
	Main Season	Off Season	Total	Main Season	Off Season	Total	Main Season	Off Season	t/Ha
CENTRAL									
Rainfed	2641	519	3160	7006	1121	8127	2.65	2.16	2.57
Irrigated	427	436	863	1255	1295	2550	2.94	2.97	2.95
Sub-Total	3068	955	4023	8261	2416	10677	2.70	2.53	2.65
NORTHERN									
Rainfed	4638	88	4726	10684	220	10904	2.30	2.50	2.31
Irrigated	873	502	1375	2254	1279	3533	2.60	2.55	2.57
Sub-Total	5511	590	6101	12938	1499	14437	2.35	2.54	2.37
WESTERN									
Rainfed	2213		2213	3924		3924	1.80		1.80
Irrigated									
Sub-Total	2213		2213	3924		3924	1.80		1.80
TOTAL									
Rainfed	9492	607	10099	21614	1341	22955	2.30	2.21	2.27
Irrigated	1300	938	2238	3509	2574	6083	2.70	2.74	2.72
GRAND-TOTAL	10792	1545	12337	25123	3915	29038	2.33	2.53	2.35

Source: Annual Report for the Year 1991

Ministry of Primary Industries and Co-operatives

⑧ 第1次産業・協同組合省組織図

Ministry of Primary Industries Forestry and Cooperatives
Organization Chart



(5) フォローアップ関係

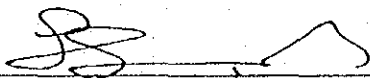
フォローアップの討議事録（1993年2月26日）

THE RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE AUTHORITIES CONCERNED
OF THE GOVERNMENT OF THE REPUBLIC OF FIJI
ON THE FOLLOW-UP PROGRAM OF TECHNICAL COOPERATION
FOR THE IMPROVEMENT OF RICE CULTIVATION TECHNOLOGY PROJECT IN FIJI

With regard to the project for the Improvement of Rice Cultivation Technology (hereinafter referred to "the Project") scheduled to terminate its cooperation period on April 17, 1993, Japan International Cooperation Agency (JICA) had a series of discussions, based on the Joint Evaluation Report signed on November 11, 1992, through the representative of JICA Fiji Office with authorities concerned of the Government of the Republic of Fiji on the follow-up program of technical cooperation for the project.

As a result, both sides agreed to recommend to their respective Governments to take necessary measures for the follow-up program of the Project according to the Annex attached hereto until 17 August, 1993 in order to complete the remaining activities of the Project shown in the Joint Evaluation Report.

Suva, Fiji, February 26, 1993



Mr. Hideaki Ito
Resident Representative in Fiji
Office of Japan International
Cooperation Agency



Mr. Nemani Buresova
Permanent Secretary
Ministry of Primary Industries,
Forestry and Co-operatives

ANNEX

Terms of Reference

1. Activities of Japan Technical Cooperation in the Follow-up program

1. Training and Coordination

1) Management and instruction for the Long-term and Short-term training courses conducted by Fiji counterpart personnel.

2) Coordination of the Project activities.

2. Agricultural Extension

Instruction of extension activities implemented by the Fiji extension officer on the four (4) pilot farms, especially in the Northern Division, together with Fiji counterpart personnel.

II. The Tentative Schedule of Implementation

	1993 April	1993 August
1. Japanese Side		
1) Assignment of Japanese Experts		
--- Training and Coordinator	-----	-----
--- Agricultural Extension	-----	-----
2. Fiji Side		
1) Assignment of Counterpart and Administrative Personnel		
--- Project Manager	-----	-----
--- General Counterpart	-----	-----
--- Training	-----	-----
--- Agricultural Extension	-----	-----

to /r

2) Land, building and facilities -----

3) Allocation of running cost for the
follow-up activities -----

111. All matters other than those metioned above concerning the follow-up program will be conducted according to the provision in the Attached Document of the Record of Discussion (R/D) signed on April 18, 1985 (revised on July 21, 1988).

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