

(1) Study on Establishment of Appropriate Irrigation Methods

Data on terminal irrigation system (from supplementary farm ditch to internal ditch) were collected from existing documents of NIA and from field tests.

3.2.3. Water Management Section

(1) Study on Establishment of Appropriate Irrigation Methods

On field tests required for designing on-farm irrigation systems (such as water distribution test, intake rate test, etc.), applicability of the test methods generally used in Japan to the Philippines' diversified land was verified. Appropriate test methods have, then, been established after minor modifications. These methods were included in the DCIE manual.

(2) Field Study, Test and Measurement to Design Water Requirement and Irrigation Interval

The irrigation water requirements are fundamental components of determining irrigation amount and intervals, such as field capacity (FC), depletion of moisture content for optimum growth (DMCOG), effective soil layer depth (ESLD), soil moisture extraction pattern (SMEP) and consumptive use (CU). On the requirements, applicability of the determination procedures generally used in Japan to the Philippine diversified land was verified. The appropriate determination procedures have, then, been established after minor modifications. Applying the procedures, reference design values were obtained, and included in the DCIE manual.

3.2.4. Pedology Section

Some investigations were performed in order to get data required for determining irrigation schedules and cultivation practices of diversified crops by examining soil samples at many points in the trial farm. The investigations for irrigation schedule are as follows: measurements on moisture content at field capacity; calibration between soil and water content suction (pF); moisture content determination at initial wilting point; and effective root zone. Results of these investigations have been integrated for determining available water content in the soil by the Water Management Section.

3.2.5. Agronomy Section

Seventeen selected candidate crops such as onion, garlic, tomato, corn, pechay, bell pepper, cabbage, squash, sweet potato, eggplant, okra, peanut, mungbean, string bean, radish, carrot and watermelon were tested to examine their performance as diversified crops of dry season in paddy field. Except for watermelon, all crops gave considerable yield, showing their high suitability to irrigated paddy field. On eight crops which are popular in central Luzon, information on their cultural practices was taken from the field studies, e.g. sowing, tillage method, mulching and irrigation starting point.

The remaining works on this aspect are to examine effects of various irrigation methods on the growth and yield of upland crops in actual irrigation areas.

3.3. Technology Criteria

The purpose of preparation of the technology criteria is for the NIA engineers and other staff of relevant disciplines to be able to conduct feasibility study (F/S) of actual diversified crop irrigation project. Though the emphasis is given on the technological aspect, some attention is also paid to the economic or marketing aspect. The flow chart of DCIE Manual is shown in Figure 1.

Application study of the technology criteria to the actual field still has to be done in the future. The preparation of technology criteria could be said to be mostly achieved in the light of the R/D of DCIEP.

3.3.1. Planning Section

The results of collection and analysis of data and field studies have been reflected for the preparation of the DCIE Manual, then the objective of the study is accomplished.

Especially, the introduction of the interview method for the investigation of farmers intention is useful. In the extension of diversified crops in the actual field, the consideration of farm-household economy is necessary.

3.3.2. Design Section

On determining effective rainfall, designing internal ditches, estimating reference crop evapotranspiration and other considerations for designing facilities, the manual includes basic theories, calculation, processes, design examples and sample results. Compared with the first revision, the description of the present revision is highly improved to be well understood by the users. From the technical point of view, verification of applicability of the Manual for F/S still remains to be done although pre-test of the applicability was partly made. The verification which can be done only during dry season should be considered as one of the important future job item.

3.3.3. Water Management Section

The contents of the Manual assigned to Water Management Section are classified into two, namely, system level and field level. Since there are many works on system level manuals accomplished by NIA, the system level contents in the DCIEP manual was made to supplement the NIA's existing manuals. The present contents of the Manual has reached a desirable level including enough supplemental contents.

For selecting irrigation methods, the DCIE Manual includes only one irrigation method, surface irrigation, including three types of systems such as level border, contour levee and level furrow. However, the possibility of applying other irrigation

methods/systems are expected to be studied in the future.

3.3.4. Pedology Section

Theory and methods were described on the investigations concerning land classification, soil condition and soil water relation. Besides the DCIE Manual, some operation manuals were prepared for investigation. They were illustrated step by step with many pictures described for the utilization of training course and beginner staff.

However, description was focused on very strict method in determining irrigation schedule. It is desired that other simple and rough methods will be also described for the actual field irrigation.

3.3.5. Agronomy Section

Information compiled from collected data were described for the reference purposes in choosing diversified crops and determining cropping patterns in actual irrigation areas. They consisted of responses of diversified crops to soil texture, soil pH, soil fertility, climate conditions such as temperature, rainfall, and light conditions. Their tolerance to pests and diseases, profitability and cropping patterns which are adaptable to 4 types of climate and potential crop yield have been included. Additional technical guide entitled as "Selected Diversified Crops Production Guide" was compiled and printed to be used by technical staff of NIA for information of non-rice crops in the existing irrigation systems.

3.4. Technical Training

One of the activities of DCIEP was to conduct technical training for technical staff members of NIA. Details of TSI for the training were formulated upon the arrival of the expert on training in December 1989 (about 3 and a half years after the initiation of DCIEP). Main activities of the training section were: (a) identification and formulation of training subjects/courses; (b) preparation and reproduction of training materials, visual aids, and textbooks; (c) conduct of training; and (d) other related activities. Within a rather short period in the total cooperation of 5 years, several training programs have been prepared and conducted.

Prior to preparing the training courses, hierarchy of NIA, number technical staff members assigned to each position and their job description were studied. There are about 2,000 technical staff members in NIA; most of them (about 90%) are civil engineers and irrigation engineers. Other technical staff members are those of agronomists/agriculturists, farmer organizers, geologists/hydrologist and so on.

As shown in Table 7, the training courses conducted were: (a) Workshop for Trainers; (b) Monthly Seminar on Crop Diversification; (c) Group Training Course on Diversified Crops Irrigation Engineering; and (d) Seminar on Irrigated Non-Rice Crop Production. All of the seminars and training courses were

conducted at the newly constructed DCIEC.

3.4.1. Workshop for Trainers

The workshop was conducted for all the counterparts and some support staff members for 3 days in 1990. The objective of the workshop was to strengthen their capabilities for preparation and conduct of lecture. Contents of the workshop were: (a) principles and conditions of learning; (b) act of facilitating; (c) training methodology; (d) job description analysis; (e) setting behavioral training objectives; (f) course content preparation, (g) training methods and techniques, (h) training aids and materials; and others.

There were some resource persons invited from System Management Department, Personnel and Records Management Department and Institutional Development Department of NIA. The workshop was effective for improving the training skills of counterparts and support staff. It was also created better relationship between the DCIEP and other Departments in NIA.

3.4.2. Monthly Seminar on Crop Diversification

Seminar on Crop Diversification was conducted every month from August to November 1990 and March to May 1991. The seminar was organized to provide a forum on crop diversification for those not only assigned to DCIEP but also working at NIA Central Office. As mentioned in Table 8, there were 11 resource persons invited to the seminar, and 993 participants in total.

The seminar provided information related on diversified crop production research in different organizations (i.e. International Rice Research Institute, International Irrigation Management Institute, Mariano Marcos State University, Central Luzon State University, etc.). Topics of the seminar included irrigation system, water management and irrigation method, farming practices, marketing and others. The seminar was effective for NIA staff (especially those assigned to DCIEP) to obtain information on crop diversification research and its findings in the Philippines.

3.4.3. Group Training Course on Diversified Crops Irrigation Engineering (DCIE)

The general purpose of the course was to introduce the DCIE technology to NIA technical personnel and promote its implementation in existing irrigation systems to attain higher level of cropping intensity and production of agricultural crops. As mentioned in Table 1, A Principal Course (1 batch) and Senior Courses (2 batches) were conducted for engineers, and 3 Junior Level Courses (1 batch) were conducted namely for irrigation engineers, economists, and soil technologists/agriculturists/agronomists. The periods of training ranged from 5 to 14 days. The total number of participants to the courses was 181. It is about 9% of NIA's technical staff (including those in the Central Office).

Besides JICA experts and the counterparts working at the

DCIEP, other resource persons were invited as lecturers of the training courses. Each of the course conducted in 1990 consisted of lectures, discussions, practices, and an observation tour; those in 1992 were without observation tours. Handouts (lecture materials) were distributed, and slides, video and overhead projector were used to facilitate understanding of the topics. According to the comments of the participants, most of them satisfied the contents and accommodation of the training course.

3.4.4. Seminar on Irrigated Non-Rice Crop Production

The main purpose of the seminar was to disseminate the DCIE technology and information on upland crops cultivation in dry season paddy fields under irrigation. It was conducted from November 25 to 29, 1991. There were 60 participants; 31 farmers (members of irrigators associations in Luzon island), 11 NIA field personnel, 18 DCIEP staff (8 Japanese experts and 10 counterparts).

Not only the technical aspects on irrigated non-rice crop production but also socio-economic aspects (i.e. credit system, economics, institutional development, etc.) were presented at the seminar. According to the comments of the participants, the seminar was appreciated by the participants except some further modifications (i.e. adding observation tour).

3.4.5. On Training in General

Identification of training target, preparation of training materials and conduct of training have been done within the short period after the arrival of expert on training. The training materials were prepared by the section members (including 3 short-term experts), other staff members of DCIEP and NIA, and external lectures in the Philippines. From the aspect of future training programs, further development of training materials regarding the DCIE Manual should be considered. Through conducting several training courses, the section staff acquired the concept and procedures of training on DCIE.

4. MANAGEMENT OF DCIEP

4.1. Administrative Aspect

The DCIEP has been set by the Administrator of NIA, who bears overall responsibility for the Project, and implemented as one of the foreign assisted projects under the Assistant Administrator for Systems Operation and Equipment Management (SOEM). Details of the organization structures of NIA and the DCIEP are shown in Figures 1 and 2.

As the counterparts of Japanese Team Leader, the Project Manager has been assigned to the DCIEP with responsibility for administration and managerial matters of the Project. Enough number of Philippine counterparts have been also assigned in the eight fields of DCIEP as mentioned earlier.

According to the R/D, the Joint Committee composed of both Philippine and Japanese members, has held meeting once whenever necessity arise to discuss fundamental issues of the DCIEP.

The staff meeting among project members has been held monthly to coordinate activities of the Project. The editorial committee of the Project on DCIE Manual has been held some times since August 1991. Internal meeting of the Japanese experts has been held to review and coordinate the activities.

The DCIEP has been managed well in general with mutual understanding and collaboration of both Japanese and Filipino staff. Some administrative issues, however, can be pointed out as follows:

- (1) The DCIEP has not established its permanent status in the administrative structure of NIA;
- (2) Some Filipino personnel of the DCIEP are not in permanent positions; and
- (3) In some fields, including the Project Manager, replacements of the counterparts have occurred more than once; late deployments of the counterparts were also observed.

These issues may lead to negative effects on the DCIEP in inheriting transferred technology and in utilizing the DCIEP after the termination of Japanese cooperation.

4.2. Financial Aspect

The total input for the DCIEP would be approximately 61.7 million pesos, which have been shared between JICA (56% of the total input) and NIA (44%) as indicated in Table 4. JICA contribution can be divided into the cooperation fund (8%), procurement of equipment and machinery (38%) and special budgetary measures (9%) as mentioned in 2.1. On the other hand, NIA's contribution have mainly allocated for running costs for the main office (26%; indirect cost) and the trial farm (18%; direct cost), namely, personal expenses, fuel, land rent for the trial farm, maintenance of DCIEP Building and others.

For the past four years (1987-1990 PFY), NIA's expenditures for the DCIEP had been covered by its corporate fund coming from various sources of revenues of NIA. Because of limitation of the fund, some part of the running cost of DCIEP, namely, maintenance of equipment and machinery, operation cost of the trial farm, preparation of stationary and some portion of fuel and wage, have been supplemented by JICA cooperation fund. Since 1991 PFY, Philippine subsidies for DCIEP has come from the capital outlay (national budget) instead of NIA corporate fund.

5. EFFECTS OF DCIEP

With the attainment of self-sufficiency in rice, the Government of the Republic of the Philippines has been placing more emphasis on the production of non-rice crops. After preparatory surveys, the DCIEP was initiated for the purpose of development of irrigation engineering for diversified crops in the country, thus contributing to the promotion of diversified crops production and agricultural development of the country.

Technical cooperation of Japanese Government on DCIEP has been carried out for 5 years since May 28, 1987. The items of cooperation are: (a) to collect and analyze data and information; (b) to conduct field studies on establishment of appropriate

irrigation methods, diversified crops cultivation techniques and others; (c) to prepare technology criteria; and (d) to conduct technical training for technical staff members of NIA.

To reinforce the activities of DCIEP and improve some other functions of NIA, the Diversified Crops Irrigation Engineering Center (DCIEC) was constructed with the cooperation of Japan's Grant Aid Program in 1990.

Owing to the efforts and mutual understanding among Japanese experts and Filipino counterparts (including support staff), and supports from concerned organizations and personnel of both Japanese and Philippine Governments, the DCIEP has shown steady progress in the last almost 5 years. All of the items indicated in the R/D and TSI of the Project have been mostly attained.

Some of the achievements of DCIEP are: (a) completion of "Diversified Crops Irrigation Engineering (DCIE) Manual"; (b) training of counterparts and support staff; (c) training of concerned personnel related to diversified crops irrigation; (d) collection and dissemination of data on irrigation development; and (e) compilation of materials and others.

The highlights of the Project are as follows:

- (1) Contributed to the promotion of the development of irrigation engineering technology for diversified crop production.
- (2) Professional advancement of NIA personnel related to diversified crops irrigation engineering technology.
- (3) The DCIE Manual and other related materials on crop diversification were prepared as ready references on conducting F/S for diversified crop promotion project.
- (4) The DCIEP has played as one of resource centers of National Committee on Crop Diversification.

The Project activities (cooperation items) were more on basic matters for the formulation of technology criteria. As a result, the DCIE Manual is the main product of the Project. It has been compiled using the available information and output of field studies on diversified crops irrigation engineering and its related subjects. It is expected that the Manual is to be utilized by technical staff of NIA prior to introducing diversified crops cultivation in their irrigation systems.

Furthermore, other materials (i.e. handouts, slides, video, etc.) have been produced in the fields of irrigation engineering (planning criteria, design criteria, water management), agronomy, pedology and training. As an example, the list of materials distributed one of the training courses is in Table 9. Other manuals and reports produced at the Project are in Table 10.

Another effect of the Project is the one regarding the human resource development. The abilities of Filipino staff working at the Project have improved through the technical transfer and cooperation at field as well as office and attending training programs in Japan. From the stand point of technical training of NIA staff, several kind of training courses and seminars were conducted for dissemination of findings of the Project to technical staff of NIA and some farmers.

Since the cooperation items of the Project were more on basic matters, there is no immediate diffusion of the findings to existing irrigation systems at the moment. Although there are some areas where non-rice crops are planted in paddy fields under

irrigation condition in dry season, they are not directly related to the Project. However, the Manual compiled by the Project will be useful not only for introducing diversified crops in the new areas but also improving the farming and irrigation practices of existing diversified crops area.

The Project attained most of the objectives of cooperation items, but there is not much contribution so far for its ultimate goal of the promotion of diversified crops production in the country. Then, long-term effects of the Project are expected through detailed studies of site specific matters, proper orientation and motivation of the farmers, communication and collaboration with other related organizations, follow-up monitoring on farming and irrigation conditions, and other support (if necessary).

6. CONCLUSIONS AND RECOMMENDATIONS

As the results of the evaluation study conducted by the Joint Evaluation Team, accomplishment of the DCIEP, so far, is considered fundamentally to have progressed as scheduled under the R/D and the TSI of the DCIEP, although a little work still remains to be done and which is expected to be accomplished within the remaining period, March to May 1992. Regarding criteria whose preparation is the main item of DCIEP, so far the criteria formulated are mainly concerned with theoretical aspect and less emphasis is put on the actual field irrigation operation.

Considering the above, it is recommended to verify first the technical applicability of the criteria in a few selected project areas. Secondly, it is necessary to prepare more "easy-to-use" technology criteria, (so called the manual), in which more emphasis is to be put on application aspect rather than theoretical aspect in order to facilitate the use of the said manual by the NIA technical staff conducting F/S of actual diversified crop irrigation projects.

For the above cited purposes, it is recommended to extend the present DCIEP for one year as a follow-up cooperation.

Main areas to be covered by the Japanese side for the extension period are planning criteria, design criteria, water management and soil science, as well as leader and coordinator in terms of personnel.

Moreover, the technology criteria mainly focuses on the technical aspect as stated above, even after the manual will have been prepared, and in that connection it is recommended to amplify and deepen the technical criteria more on the aspect of economy and marketing in order for the farmers to benefit from the diversified crop irrigation project, in the long run.

Table 1. List of Japanese Experts Assigned to DCIEP

A. LONG-TERM EXPERTS		T E R M				R E M A R K S
		O R I G I N A L		E X T E N S I O N		
1. TEAM LEADER	M. MORIKAWA	10-01-87	09-30-89	10-01-89	03-31-90	Up to the end of the project
	M. FUKUDA	04-07-90	04-06-92	04-07-92	05-27-92	
2. PROJECT COORDINATOR	T. SASAKI	09-09-87	09-08-89	09-09-89	09-08-90	
	Y. HASHIMOTO	08-19-90	05-27-92	-	-	
3. PLANNING EXPERT	Y. KOSO	10-01-87	09-30-89	-	-	Up to the end of the project
	M. ISHIKAWA	09-25-89	09-24-91	09-25-91	05-27-92	
4. DESIGN EXPERT	K. YAMASHITA	10-01-87	09-30-89	10-01-89	09-30-90	Extended for one (1) year
	S. SUGAWARA	09-26-90	05-27-92	-	-	Up to the end of the project
5. WATER MGT. EXPERT	H. KANAMORI	09-09-87	09-08-89	09-09-89	09-08-91	2nd extension 3rd extension
				09-09-90	09-08-91	
				09-09-91	05-27-92	
6. PEDOLOGY EXPERT	Y. TOKUNAGA	10-01-87	09-30-89	10-01-89	09-30-90	Up to the end of the project
	K. MIYANO	09-26-90	05-27-92	-	-	
7. AGRONOMY EXPERT	M. KIKAWA	04-13-88	04-12-90	04-13-90	04-12-91	2nd extension
				04-13-91	05-27-92	
8. TRAINING EXPERT	T. NOJIRI	12-19-89	12-18-91	12-19-91	03-31-92	

B. SHORT-TERM EXPERTS		DATE OF ASSIGNMENT	REMARKS
1. CONSTR. ADM.	M. MORITANI	December 10, 1987 - February 11, 1988	-
2. CONSTR. SUPV.	S. HOSONO	January 10 - May 8, 1988	-
3. IRRIG. RESEARCH	T. KOSOGUE	July 22 - August 12, 1988 March 29 - April 22, 1989	2nd Assignment 3rd Assignment
4. ELECTRIC RESISTANCE METHOD	T. KOSOGUE	January 5 to 19, 1991	
5. WATER BALANCE	T. NAKA	October 24 - November 23, 1988 August 21 - September 10, 1989	2nd Assignment
6. COMPUTER ENGR.	M. ETO K. MURAKOSHI	February 28 - March 22, 1989 October 17 - December 22, 1989 July 10 - August 9, 1990	2nd Assignment
7. ECONOMICS	R. SHIGENO	May 24 - August 24, 1989	
8. MECHANICAL ENGR.	K. ICHINO	October 17 - December 15, 1989	
9. FARMING SYSTEM	A. OTSUKA	March 27 - April 26, 1990	
10. IRRIGATION SYSTEM	R. SHIBUKAWA	March 27 - April 26, 1990	
11. TRAINING OFFICER (Material Development)	H. TOYODA	July 2, 1990 - May 1, 1991	
12. PROJECT PLANNING	S. HIROSE	November 7-29, 1990	
13. AGRICULTURAL ENGINEERING	S. HIROSE	January 22 - February 6, 1992	2nd Assignment
14. AGRICULTURAL ENGINEERING	H. ODANI	January 22 - February 6, 1992	
15. IRRIGATION EQUIPMENT MAINTENANCE	H. SHINOGI	March 9 - 28, 1992	

Table 2. Training and Study/Observation Tour in Japan

N A M E	COURSE TITLE	DATE ATTENDED/SCHEDULE
JAPAN FISCAL YEAR 1987-88		
LUZVININDA B. RASOS - Engineer B NIA-Project Development Department	Irrigation Planning	FEB 7 - MARCH 4, 1988
LEONARDO T. COSTA Sr. Agronomist A (Agronomy C/P) NIA-Project Development Department	Agronomy Counterpart Training	FEB 7 - MARCH 4, 1988
ARISTON H. NOLASCO - (Farm Manager) Principal Engineer C, DCIEP	Irrigation and Drainage	MARCH 31 - JUNE 20, 1988
RENATO A. DE LARA Training Specialist B (Training C/P) NIA-Systems Management Department	Audio-Visual	MARCH 24 - MAY 20, 1988
JAPAN FISCAL YEAR 1988-89		
REINERIO E. IRINCO Sr. Engineer B (Planning C/P) NIA-Project Development Department	Agric'l Land and Water Resources Development	JUNE 13-SEPTEMBER 14, 1988
SEBASTIAN I. JULIAN NIA - Asst. Administrator for SOEM	Observation Tour	JUNE 25 - JULY 7, 1988
SERAFIN A. PALTENG Project Manager, DCIEP	Observation Tour	SEPT. 28 - OCTOBER 15, 1988
ALEJANDRO S. CANTOR Sr. Soil Tech A (Pedology C/P) NIA-Project Development Department	Crop Irrigation	SEPT. 25 - DECEMBER 7, 1988
JAPAN FISCAL YEAR 1989-90		
ALBERTO S. ADRIAS Principal Engineer B, DCIEP	Irrigation Water Management Group Training Course	MAY 8 - NOVEMBER 22, 1989
EDUARDO B. ALDABA Principal Engineer B (Design C/P) DCIEP	Agric'l Land and Water Resources Development	AUG 14 - NOVEMBER 4, 1989
BONIFACIO S. LABIANO Principal Engineer B (Water Management C/P), DCIEP	Water Management	AUG 24 - NOVEMBER 29, 1989
HOMER M. ATANACIO Research Analyst B, DCIEP	Personal Computer Network	NOV 23 - MARCH 26, 1990
DOMINADOR D. PASCUA Principal Engineer C NIA-Project Development Department (Designated Officer-In-Charge)	Observation Tour	MARCH 18 - APRIL 4, 1990

N A M E	COURSE TITLE	DATE ATTENDED/SCHEDULE
JAPAN FISCAL YEAR 1990-1991		
AVELIO C. LUZ Engineer A, DCIEP	Irrigation Water Management Group Training Course	APRIL 16 - OCTOBER 12, 1990
LILIAN PAPPADOS Soil Tech B, DCIEP	Diversified Crops Engineering	SEPT 3 - DECEMBER 4, 1990
JOSE A. GALVEZ NIA- Asst. Administrator for SOEM	Observation Tour	OCT 30 - NOVEMBER 8, 1990
LOUELLA R. MERCADO Sr. Accounting Processor A, DCIEP	Personal Computer Network	NOV 21 - MARCH 31, 1991
JAPAN FISCAL YEAR 1991-92		
LEONARDO T. COSTA Sr. Agronomist A (Agronomy C/P) NIA-Project Development Department	Vegetable Production and Research Technique	JULY 30 - OCTOBER 23, 1991
FRANKLIN S. RAMONES Principal Engineer C (Planning C/P) DCIEP	Agric'l Land & Water Resources Development	MAY 27 - AUGUST 11, 1991
CIRIACO L. CAMACHO NIA - Asst. Administrator for Finance and Management	Observation Tour	JULY 17-31, 1991
RICARDO V. JOSON Sr. Industrial Relations Devp. Chief (Training C/P), DCIEP	Irrigation Upland Technology Planning & Training	AUG 13 - OCTOBER 9, 1991
ELIZA P. JRCIEL Senior Economist, DCIEP	Practical Statistics Course II	SEPT 19 - MARCH 23, 1992

TABLE 3

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT (DCIEP)
LIST OF TECHNICAL COOPERATION EQUIPMENT
(UNIT VALUE >= ¥500,000 ONLY)

SEQ. NO.	JFY	DESCRIPTION	SPECIFICATION	UNIT VALUE	Q'TY	VALUE(¥)	SECTION	LOCATION	MNT	FREQ.	REG. DATE
8700001	87	TOYOTA LANDCRUISER STATION WAGON	ENG NO: 1173982	2170000	1	2170000	PMS	DCIEP-C.O.	A	DAILY	07/01/88
8700002	87	TOYOTA LANDCRUISER STATION WAGON	ENG NO: 1174345	2170000	1	2170000	PMS	DCIEP-C.O.	A	DAILY	07/01/88
8700003	87	TOYOTA CORONA STATION WAGON	ENG NO: 0963205	1380000	1	1380000	PMS	DCIEP-C.O.	A	DAILY	07/01/88
8700004	87	TOYOTA CORONA STATION WAGON	ENG NO: 0963218	1380000	1	1380000	PMS	NIA-C.O.	A	DAILY	07/01/88
8700016	87	DISC UNIT- NEC PC-98H81	NEC PC-98H81	500000	1	500000	PMS	DCIEP-C.O.	A	DAILY	08/11/88
8700055	87	MULTI-FOLD PF METER	DIK-3420	1325000	1	1325000	PEDODOGY	SOIL-LAB.	A	OFTEN	08/11/88
8700069	87	FLOW METER (BARRAGE TYPE)	TRANSMITTER MV-500RI	1600000	2	3200000	W.MGT	TRIAL-FARM	A	SELDO M	08/11/88
8700070	87	FLOW METER (BARRAGE TYPE), TRANSMITTER MV500RI	W/ARRESTOR, CONVE RTER, CABL	1085000	2	2170000	W.MGT	TRIAL-FARM	A	SELDO M	08/11/88
8700114	87	CENTRIFUGE FOR PF, W/U ROTOR	MODEL: H-65S	1925000	1	1925000	PEDODOGY	DCIEP-C.O.	A	OFTEN	08/11/88
8800001	88	MITSUBISHI MICROBUS "ROSA" 29 SEATER	ENG NO.: 4D31-696516	3040000	1	3040000	PMS	DCIEP-C.O.	A	DAILY	03/11/89
8800053	88	MITSUBISHI PICKUP TRUCK 3 SEATER	ENG NO.: 4D56-CH3836	1130000	1	1130000	AGRONOMY	TRIAL-FARM	A	DAILY	03/11/89
8800092	88	PARTS FOR SOIL TENSIONMETER, AIR POOL, POLYVINYL	PIPE, STOPPER, S.RUBBER	1791700	1	1791700	W.MGT	TRIAL-FARM	C	CONSUMING GOODS	08/03/89

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT (DCIEP)
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(UNIT VALUE >= \$500,000 ONLY)

SEQ. NO.	JFY	DESCRIPTION	SPECIFICATION	UNIT VALUE	Q'TY	VALUE(\$)	SECTION	LOCATION	MNT	FREQ.	REG. DATE
8800093	88	RECORING TENSIO METER, VACUUM GAUGE TYPE	DIK-3202	1447400	1	1447400	W.MGT	TRIAL-FARM	A	OFTEN	08/03/89
8800094	88	SOIL TENSIO METER, TERADA TYPE	DIK-3120	678500	1	678500	W.MGT	TRIAL-FARM	A	SELDO M	08/03/89
8800101	88	THREE PHASE METER, DIK-1120	LOAD CELL TYPE	616800	2	1233600	PEDOLOGY	SOIL-LAB.	A	OFTEN	08/03/89
8800102	88	W/ELECT. BALANCE	DIK-2000	745300	1	745300	PEDOLOGY	TRIAL-FARM	A	SEDO M	08/03/89
8800103	88	SOIL PH METER	DIK-3340	1439100	1	1439100	PEDOLOGY	SOIL-LAB.	A	OFTEN	08/03/89
8800107	88	W/CONSUMING GOODS	W/STAINLESS PLATE	2004400	1	2004400	AGRONOMY	TRIAL-FARM	A	NEVER	08/03/89
8800112	88	AGRICULTURAL OVEN, SUNAKA, 40-200°C, 1500x1000 x900		1012500	1	1012500	AGRONOMY	TRIAL-FARM	A	SELDO M	08/03/89
8800116	88	AUTO-HORTICULTURAL LUX METER W/SPARE PARTS	GAS BOMBE	858300	1	858300	AGRONOMY	TRIAL-FARM	A	NEVER	08/03/89
8800140	88	PLANT MOISTURE TENSIO METER, DIK-7000 PC-40		1089600	1	1089600	AGRONOMY	TRIAL-FARM	A	SELDO M	08/03/89
8800149	88	DIESEL ENGINE PUMP, PORTABLE W/ACCESSORIES	TVS-806 x 3S-11EKAWAMOTO	2271800	1	2271800	AGRONOMY	TRIAL-FARM	A	SELDO M	08/03/89

DIVERSIFIED CROPS IRRIGATION ENGINEERING PROJECT (DCIEP)
LIST OF TECHNICAL COOPERATION EQUIPMENT
(UNIT VALUE >= ¥500,000 ONLY)

SEQ.NO.	JFY	DESCRIPTION	SPECIFICATION	UNIT VALUE	Q'TY	VALUE(¥)	SECTION	LOCATION	MNT	FREQ.	REG. DATE
8800154	88	DIESEL ENGINE PUMP, PORTABLE, TVS-506x3S-M3.7E	KAWAMOTO, FOR SUMISANSUI	1243800	1	1243800	AGRONOMY	TRIAL-FARM	A	SELDO M	08/03/89
8900017	89	DRYER(YAMATO) NCD-17MX, 600-1700Kgs	3670x1365x3085mm	1096000	1	1096000	AGRONOMY	TRIAL-FARM	A	SELDO M	04/26/90
8900042	89	SOIL PF METER "DAIKI-RIKA"	DIK-4320 220V	1141000	1	1141000	PEDOLOGY	SOIL-LAB.	A	OFTEN	04/26/91
8900043	89	CENTRIFUGAL TESTER KOKUSAN	W/ U ROTALLY 220V	2730000	1	2730000	PEDOLOGY	SOIL-LAB.	A	OFTEN	04/26/90
8900049	89	ENSHINKI" H-1400PF THREE PHASE METER	SYLINDER	500000	1	500000	PEDOLOGY	SOIL-LAB.	A	OFTEN	04/26/90
8900054	89	MII TYPE DIK-1120 0-300g. 220V BOOKBINDING MACHINE "UCHIDA"	Φ 40XL100mm C-450	528000	1	528000	PMS	DCIEP-C.O.	A	OFTEN	04/26/90
8900090	89	NISSAN PATROL STATION WAGON STANDARD 4WD	ENG.NO.033643	1740000	1	1740000	PMS	DCIEP-C.O.	A	DAILY	04/26/90
9000026	90	SIMPLE RAPID TESTER, NTT TYPE W/TRANSFORMER	MODEL: NTT-101	600000	1	600000	W.MGT	DCIEP-C.O.	A	OFTEN	07/27/91
9000029	90	AC AUTOMATIC VOLTAGE REGULATOR	MODEL: SVC-2222.7	600000	1	600000	PEDOLOGY	DCIEP-C.O.	A	OFTEN	07/27/91

NOTE TO THE LIST OF TECHNICAL COOPERATION EQUIPMENTLIST

1. SECTION: SECTION NAME TO CONTROL THE ITEM

CODE	SECTION NAME
PMS	: PROJECT MANAGEMENT STAFF
PLANNING	: PLANNING SECTION
DESIGN	: DESIGN SECTION
W.MGT	: WATER MANAGEMENT SECTION
PEDOLOGY	: PEDOLOGY SECTION
AGRONOMY	: AGRONOMY SECTION
TRAINING	: TRAINING SECTION

2. LOCATION: THE PLACE WHERE THE ITEM IS ASSIGNED.

CODE	ASSIGNED PLACE
DCIEPC.O.	: CENTRAL OFFICE
SOIL-LAB.	: SOIL LABORATORY
TRIAL-FARM	: TRIAL FARM
NIA-C.O.	: NIA HDQ
OTHER	(SPECIFY NAME)

3. MNT: MAINTENANCE CONDITION OF EQUIPMENT

CODE NO.	MAINTENANCE CONDITION
A	IN A GOOD CONDITION
B	UNDER REPAIR / OUT OF ORDER
C	CONSUMING GOODS(STILL IN USE)
D	CONSUMING GOODS(ALREADY SPOILED)
E	ALREADY SPOILED DUE TO VARIOUS REASONS)
F	OTHER (SPECIFY CONDITION)

4. FREQ.: FREQUENCY OF UTILIZATION

DESCRIPTION
DAILY
OFTEN
SELDOM
NEVER
CONSUMING
OTHER

Table 4. Financial Input for DCIEP Activities

	JFY 1987-88		JFY 1988-89		JFY 1989-90		JFY 1990-91		JFY 1991-92		TOTAL	
	YM	PM	YM	PM	YM	PM	YM	PM	YM	PM	YM	PM
REGULAR BUDGET												
JICA	3.06	0.469	6.00	0.938	5.40	0.844	7.75	1.211	8.92	1.394	31.07	4.855
*JAPAN	9.89	1.546	89.37	13.964	28.83	4.504	14.83	2.317	7.93	1.239	150.84	23.589
FISCAL	8.01	1.252	73.73	11.521	20.08	3.137	14.83	2.317	4.80	0.750	121.45	18.977
YEAR	7.10	1.109	70.65	11.039	18.13	2.833	14.43	2.255	4.45	0.895	114.76	17.991
(Apr. - Mar.)	1.88	0.294	15.64	2.443	8.75	1.367	-	-	3.13	0.489	29.39	4.593
	12.89	2.015	95.37	14.902	34.23	5.348	22.58	3.528	16.85	2.633	181.92	28.425
SUB-TOTAL												
	-	-	-	-	0.94	0.147	-	-	-	-	0.94	0.147
SPECIAL BUDGET												
1. Technical Exchange Program	19.76	3.088	2.95	0.461	1.27	0.198	-	-	-	-	23.98	3.747
2. Trial Farm Construction and Rehabilitation	-	-	0.36	0.056	-	-	-	-	0.34	0.054	0.70	0.110
3. Project Seminar	-	-	1.70	0.266	0.58	0.091	-	-	-	-	2.29	0.357
4. Research Program	-	-	-	-	-	-	4.90	0.766	4.30	0.672	9.20	1.488
5. Group training	-	-	-	-	-	-	-	-	0.35	0.055	0.35	0.055
6. Public Information	-	-	-	-	-	-	-	-	-	-	-	-
	19.76	3.088	5.01	0.784	2.79	0.436	4.90	0.766	4.99	0.788	37.46	5.853
SUB-TOTAL												
	32.66	5.102	100.39	15.685	37.01	5.783	27.48	4.294	21.84	3.413	219.38	34.278
TOTAL												
NIA												
(1) Direct Cost		2.273		2.437		3.885		0.953		1.450		11.008
(2) Indirect Cost		0.842		3.140		4.856		3.181		4.350		16.029
Total (A+B)	19.936	3.115	35.693	5.577	66.006	8.751	26.521	4.144	37.120	5.800	175.276	27.387
Total												
	52.595	8.217	136.083	21.262	93.016	14.534	49.200	8.438	67.398	9.213	394.656	61.655

Table 5. Japanese Missions for DCIEP

KIND OF TEAM	NUMBER OF MEMBERS	PERIOD
Contact Survey	5	Sept. 26 - Oct. 6, 1985
Long-Term Surveyors	2	Aug. 20 - Sept. 18, 1986
Implementation Survey	5	May 19 - May 30, 1987
Consultation Survey	4	Mar. 9 - Mar. 19, 1988
Technical Guidance	5	Feb. 27 - Mar. 10, 1990
Technical Guidance	5	Jan. 15 - Jan. 24, 1991

Table 6. Philippine Personnel attached to the DCIEP

PARTICULAR	1987	1988	1989	1990	1991
Full-time Counterpart	7	8	8	8	9
Other Staff	-	35	51	57	25
TOTAL	7	43	59	66	34

Table 7 Training courses conducted at DCIEP.

	Date	No. of participants	Duration
Workshop for trainers	July 24-26, 1990	15	3 days
Training on DCIE for NIA personnel			
1 Principal course	Nov. 12-16, 1990	31	5 days
2 Senior course	Nov. 19-29, 1990	40	10 days
	Jan. 22-Feb. 7, 1992	36	14 days
3 Junior course	Feb. 12-21, 1992	41	9 days
Economist course	Jan. 22-28, 1992	15	6 days
Soil Technologist/ Agriculturist/ Agronomist	Feb. 17-21, 1992	18	5 days
Monthly seminar on crop diversification	Aug.- Nov., 1990 Mar.-May, 1991	993	0.5day/session
Seminar on irrigated non-rice crop production	Nov. 25-29, 1991	60	5 days

Note: DCIEP, DCIE and NIA stands for Diversified Crops Irrigation Engineering Project, Diversified Crops Irrigation Engineering and National Irrigation Administration, respectively.

Table 8 Topics presented at the monthly seminar on crop diversification.

Topic title	Date conducted	Resource person
On-farm water management practices for upland crops	Aug. 24, 1990	Dr. Ireneo C. Agulto CLSU
Socio-economic and water management practices affecting diversified cropping among farmers served within the TASMORIS area	Sep. 21, 1990	Dr. Alfredo S. Reyes Pampanga Agricultural College
Optimum farm ditch density for irrigated diversified crops	Sep. 21, 1990	Engr. Carlos M. Pascual Mariano Marcos State University (MMSU)
Methodology for identifying parts of irrigation systems suitable for crop diversification during the dry season	Oct. 18, 1990	Engr. Danilo M. Cablayan International Irrigation Management Institute

Table 8 continued.

Promotion of agro-based industries for crop diversification	Oct. 18, 1990	Dr. Marietta S. Adriano National Economic Development Authority
Drip irrigation method	Nov. 29, 1990	Dr. Rodolfo C. Undan CLSU
The soybean technology commercialization program	Mar. 22, 1991	Mr. Danilo C. Cardenas PCARRD
Technical consideration for riced-based farming systems: Farm level water management	Mar. 22, 1991	Engr. Domingo F. Tabbal International Rice Research Institute (IRRI)
Irrigation system management for mixed cropping	Apr. 19, 1991	Dr. Rodolfo A. Natividad MMSU
Field testing of irrigation management innovations for the Laoag-Vintar RIS Adopting diversified crops during the dry season	Apr. 19, 1991	Engr. Carlos M. Pascual MMSU
Farming systems in irrigated riced-based ecosystems its potential for increased productivity	May 31, 1991	Mr. Esteban Godilano IRRI

Note: CLSU, TASMORIS, and PCARRD stands for Central Luzon State University, Tarlac and San Miguel Odoneil River Irrigation System and Philippine Council for Agriculture, Forestry and Natural Resources Research and Development, respectively.

Table 9 Training materials distributed for the attendants of a DCIE training course in 1990.

-
- Bonifacio S. Labiano. The Diversified Crops Irrigation Engineering Project: Its Salient Aspects, 14p.
- Takashi Nojiri. Aims and Effects of Crop Diversification, 26p.
- Masakazu Ishikawa and Franklin S. Ramones. Diversified Crops Irrigation Engineering Manual: An Overview, 8p.
- Mamoru Fukuda. Study of Diversified Crops Irrigation Engineering in Japan and for DCIE Application, 11p.
-

Table 9 continued.

Shinichi Hirose. Introduction of Irrigation and Drainage Development Project in Japan, 10p.

Eduardo B. Aldaba. Terminal Irrigation Facilities: Design Criteria and Designing Procedure, 26p.

Rodolfo C. Undan. Soil-Water-Plant Relations, 26p.

Leonardo T. Costa. Different Studies Performed at Trial Farm, 16p.

Flordeliza A. Lantican. Marketing of Agricultural Products: Role, Prospects, Constraints and Strategies for Development, 34p.

Flordeliza A. Lantican. Present and Future Market Supply and Demand for Diversified Crops, 28p.

Marietta S. Adriano. An Overview of Crop Diversification in the Philippines, 29p.

Shinichi Hirose. Plan Establishment on Upland Irrigation Project in Japan, 22p.

Shigeyoshi Suzuki and Takashi Nojiri. Water Requirements, 56p.

Rodolfo C. Undan. Drip Irrigation, 17p.

Ireneo C. Agulto and Takashi Nojiri. On-Farm Irrigation Method, 55p.

DCIEP Design Section. Design Manual on Irrigation Facilities, 159p.

Hideyuki Kanamori. Engineering Approach on Crop Diversification Study in Japan, 59p.

DCIEP Water Management Section (1990) Determination of Paddy Water Requirements by Field Measurement -Theory & Procedures-, 76p.

DCIEP Pedology Section. Field Capacity Determination.

DCIEP Water Management Section & Pedology Section. Operation of Saturated Hydraulic Conductivity Test by Falling Head Method with Undisturbed Soil Samples.

DCIEP Water Management Section. Operation of Soil Tensiometers.

Takatoshi Kosuge. Determination of Irrigation Design Parameters of Furrow Irrigation & Border Irrigation by Field Measurement -Theories and Procedure-, 68p.

TABLE 10 Instruction Manuals Formulated by Each Section

1. Planning Section

" *User's Manual of Calculation Program on Water Distribution for Diversified Crops Promotion Project* " 1990

2. Design Section

" *Manual on Hydraulic Gates* " 1989

" *Design Manual on Irrigation Facilities* " 1990

" *Guidebook on the Calculation of Crop Evapotranspiration (ETc) using Modified Penman Method* " 1992

3. Water Management Section

" *Determination of Paddy Water Requirements by Field Measurement - Theory and Procedures* " 1989

" *Engineering Approach on Crop Diversification Study in Japan* " 1990

" *Manual on Discharge Measurement and Regulation* " 1991

" *Operation Manual of Tests/Surveys on On-Farm Irrigation Design and Operation* " (with Pedology Section) 1992

" *General Manual of Design and Operation on On-Farm Irrigation Systems* " 1992

" *Terminal Report of DCIEP Trial Farm Field Tests* " (with Design, Pedology and Agronomy Section) 1992

4. Pedology Section

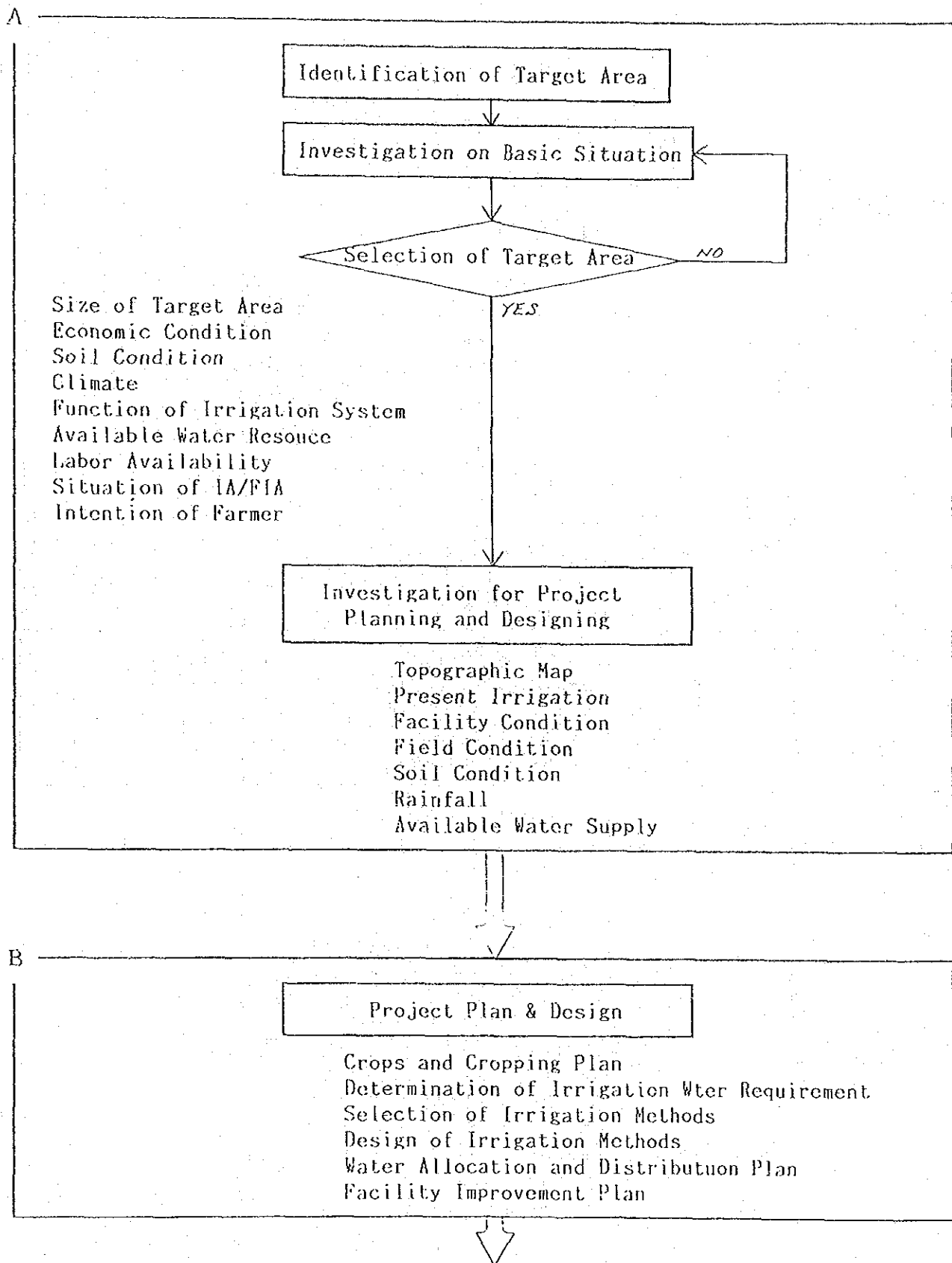
" *Determination of Irrigation Design Parameters of Furrow Irrigation and Border Irrigation by Field Measurement - Theories and Procedures* " 1990

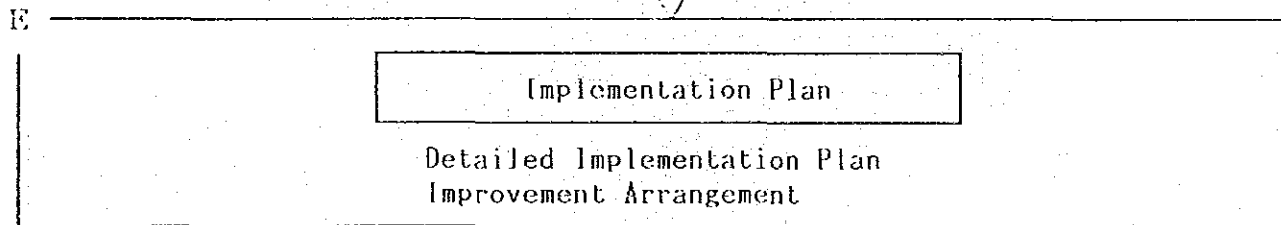
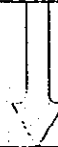
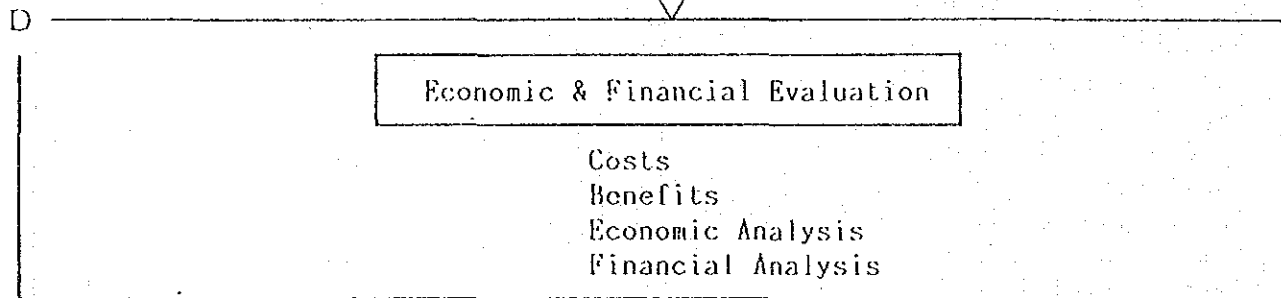
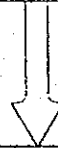
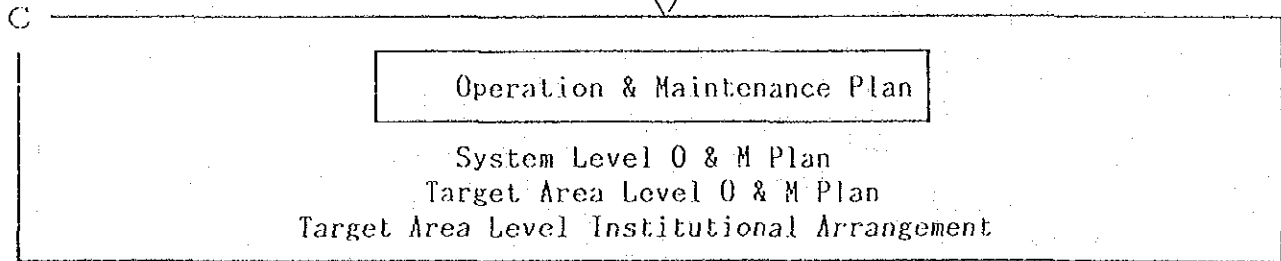
" <i>Field Capacity Determination</i> "	1990
" <i>Operation of Saturated Hydraulic Conductivity Test by Falling Head Method With Undisturbed Samples</i> "	1990
" <i>Determination of Field Capacity</i> "	1991
" <i>Manual on Three Phase Analysis</i> "	1991
" <i>Manual for Laboratory Work in Soil Moisture Content and Suction (pf) Calibration</i> "	1991
" <i>Soil Survey Manual</i> "	1991

5. Agronomy Section

" <i>Selected Diversified Crops Production Guide</i> "	1992
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Figure 1. Flow Chart of Technology Criteria





NIA ORGANIZATIONAL STRUCTURE
 FLORENCE R. ESTUAR
 ADMINISTRATOR
 APPROVED BY O B H ON NOV. 24, 1993

FIGURE 2

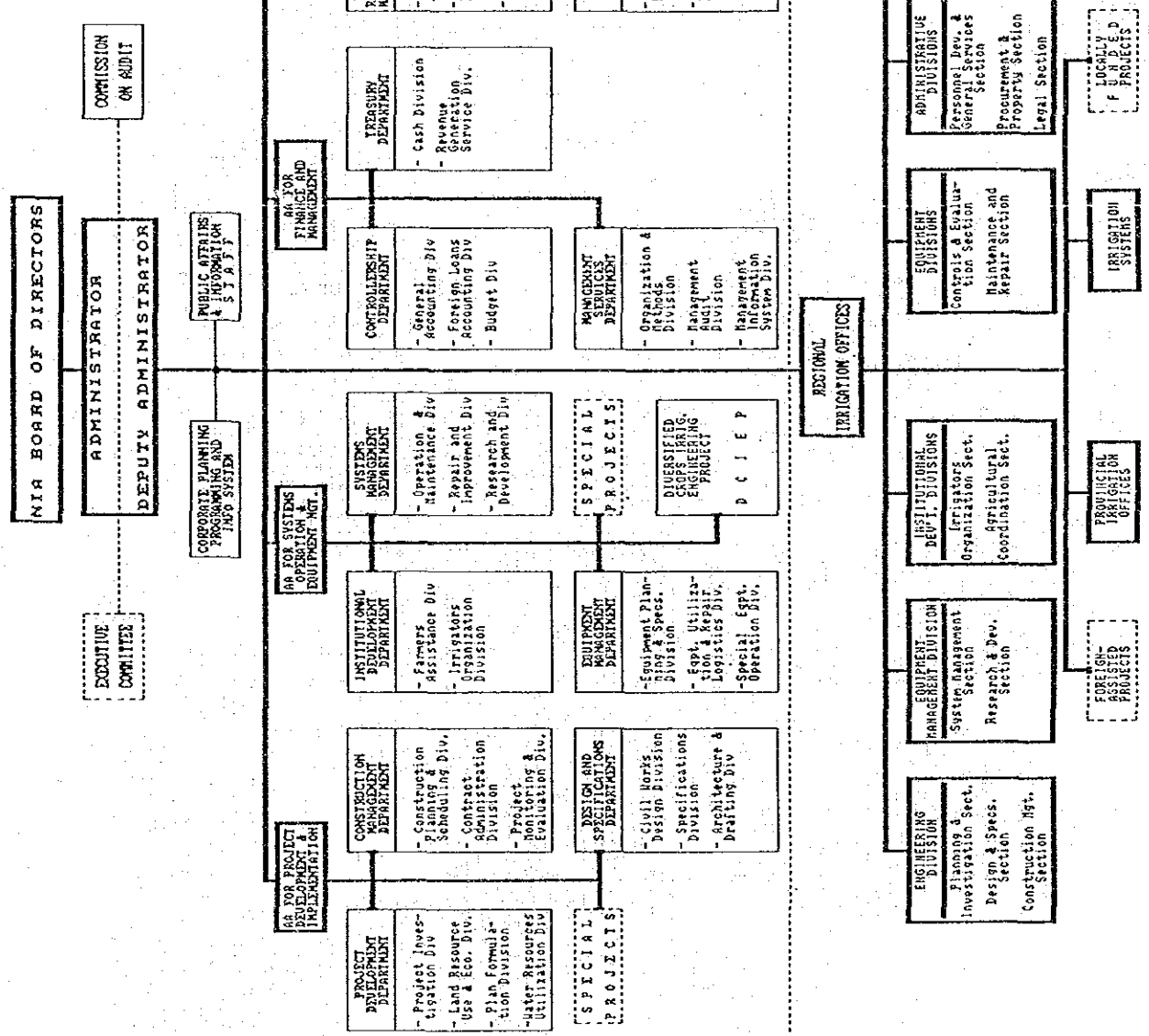
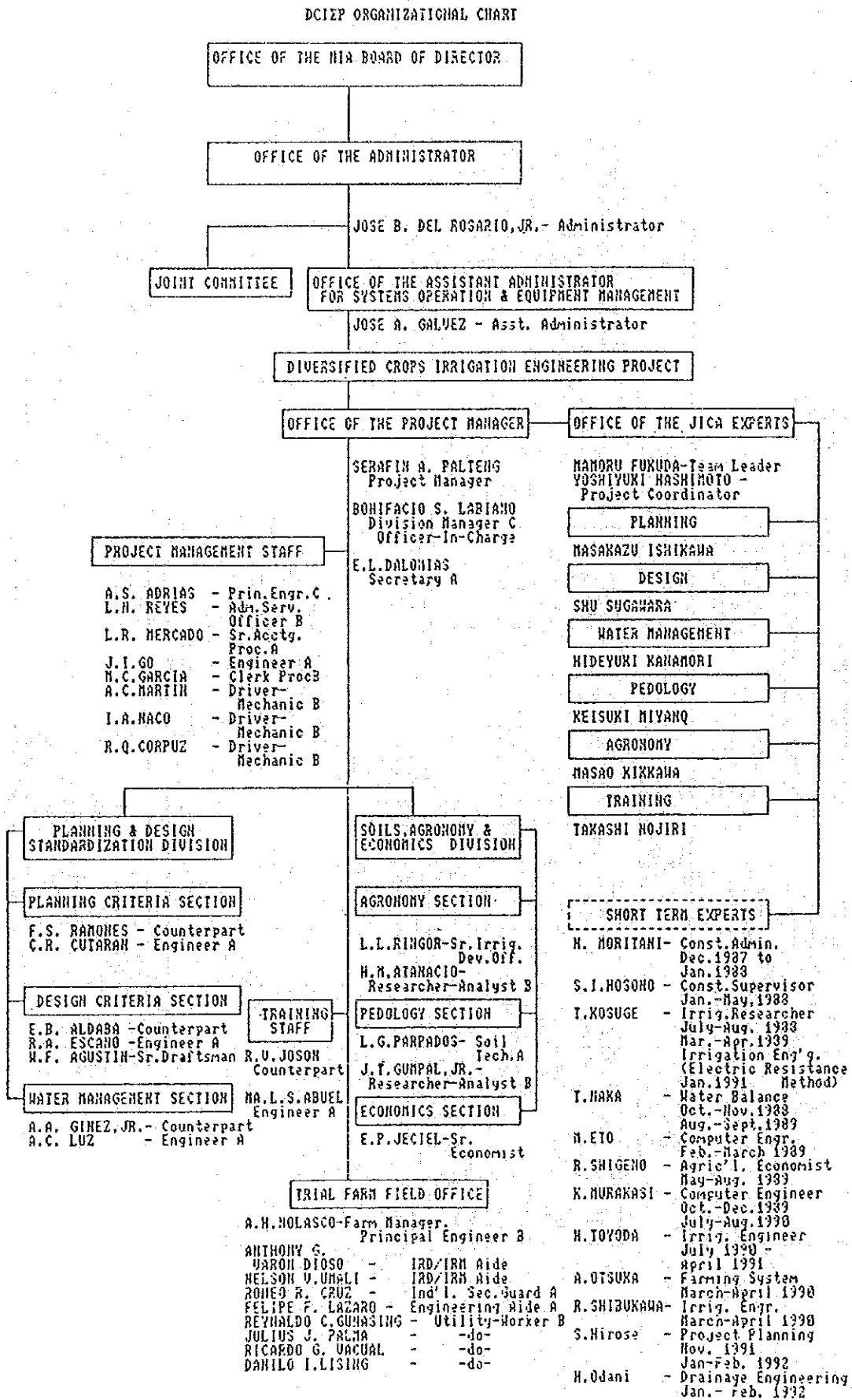


Figure 3



JICA