Development , Rice Cultivation and observation study tours on the irrigation projects in Japan. The duration of the courses varied from two weeks to ten months. During the period, eighteen Malaysian counterparts staffs were trained. Details of the participants, courses, present position and places are presented in Appendix 4.

6. MACHINERY, EQUIPMENTS AND MATERIALS

An important term under the Technical Cooperation Programme was that the Government of Japan would undertake the responsibility to provide the necessary agricultural machinery, engineering equipment and different types of materials for establishing the National Water Management Training Centre. These items were either supplied directly from Japan or purchased locally in stages over the years from 1977 to 1986. In each year during the cooperation period, the long-term Japanese Experts and Malaysian Counterparts discussed about and made requests to Japan for the provision of these items. Appendix 3 gives the list of machineries and equipments donated by the Japanese Governemnt to the centre. The machinery and equipment so far received by the centre have been utilised in the cultivation of the demonstration and pilot farms, running of the training courses as well as in the various field studies on water management and rice cultivation.

7. BUDGETARY EXPENDITURES - IMPLEMENTATION AND OPERATION

7.1. Implementation Expenditures - Technical Cooperation Period

The costs of implementation of the National water Management Training Centre during the technical cooperation programme, (Sept. 1977 - March 1986) were borne by both the Malaysian Government and the Government of Japan. The Malaysian Government was responsible for the construction of the training facilities at the campus and the pilot farms as well as the recurrent annual operation and management costs. The Japanese government, through J.I.C.A., undertook the responsibility to provide the services of experts, supply of machinery, equipment and materials, training of counterparts staff in Japan as well as the construction costs of the demonstration farm at the centre.

The breakdown expenditures and total cost incurred by both governments on this Technical Cooperation Project up to 1985 are given in Table 5, 6 and 7. The expenditures incurred by J.I.C.A. was not available for the year 1985. As indicated in the Tables, the total expenditures incurred by the Malaysian Government until the end of 1985 was M$9,040,720 and the total Japanese Government's Expenditures up to the end of 1984 was M$7,327,470. The total implementation cost of the project was M$16,368,190.

6/-

7.2. Operational Expenditures

After the completion of the Technical Cooperation period, the centre's was totally run by the Malaysian Government and all operational costs were borne by the Government in accordance with local budgetary regulations and procedures. Allocations approved to-date have been sufficient to meet the running expenditures of the Centre in a satisfactory manner. Details of the yearly approved allocations and expenditures are presented in Table 8.

8. FUTURE DEVELOPMENT OF N.W.M.T.C. - ISSUES AND PROPOSALS

8.1. Present Training Programme and curriculum

As outlined in para 2.4. and indicated in Table 3 and 4, N.W.M.T.C. has achieved remarkable progress in its training programme for the in-service courses. It is envisaged that by the year 1990, all presently serving relevant Engineers/ Agriculture Officers will have been trained. It is also envisaged by the year 1992, all presently serving Technical Assistant and by the year 1993, all presently serving Irrigation Inspectors and Irrigation Overseers would have been trained. Training programme after the above years need to be continued for new staff periodically recruited to fill vacancies as they occured.

8.2. Future Development

8.2.1. Necessity of a New Technical Cooperation Programme

The original request by the Government of Malaysia in 1975 called for a technical assistance to promote diversified agriculture as well as to increase rice yields through the introduction of proper water management for both paddy and non-paddy crops. However, the preparatory missions of the Government of Japan subsequently concluded that such a scope of involvement was too wide to be covered during the first technical cooperation period, and accordingly, N.W.M.T.C.'s development during this period was confined only to the on-farm water management for paddy.

In line with the objective of the National Agriculture Policy to promote the development of crop diversification programme in areas outside the granaries, as well as for reasons as described in para 8.1., it was imperative and within the purview of the original objective of N.W.M.T.C.'s establishment, to embark on the development of training programme for non-paddy irrigation. In this spirit, a request has been forwarded to J.I.C.A. in March 1988 for a second technical cooperation programme. The request for application of experts are presented in Appendix 5.

7/-

8.2.2. Development Proposals

8.2.2.1. General Background

The broad objective of the second technical cooperation programme is the establishment of facilities for training and supportive research in water management/ irrigation of non-paddy (upland crops). These comprise:

(i) The establishment of suitable irrigation techniques and agricultural practices including farm mechanisation for non-paddy crops.

(ii) The training of relevant officials involved in the non-paddy irrigation.

(iii) Introducing and demonstration of water and agricultural management techniques for non-paddy through demonstration and pilot farms.

The ultimate objective is to upgrade the N.W.M.T.C. into an institution for the training of government engineering and agricultural personnel as well as farmers in water management for both paddy and non-paddy (upland) crops.

Under the term of the second cooperation programme, an initial two (2) years period is allotted for, with three (3) years extension given as option, if subsequently found necessary and agreeable. Also included in the term is the supply of equipments and machineries amounting to M$1,000,000. Experts requested are; two (2) long-term experts in Agricultural Civil Engineering and Agronomy for a period of two (2) years, and two (2) short-term experts in Soil science and Farm Machinery, both for a period of six (6) months. It is also proposed to request for an expert on the double-cropping of rice to serve for a short-term period.

8.2.2.2. The Proposals

The existing N.W.M.T.C. complex will be expanded or modified to carry out the following additional activities:

(i) Establishment of water management/irrigation techniques and suitable agricultural practices including mechanisation, for selected upland crops. The water management techniques shall include surface irrigation (border and furrow), overhead irrigation (sprinkler), and localised irrigation (trickle). Brief notes and figures for the proposed development and modification of

9/-

the existing demonstration farm and campus are presented in Appendices 6 and 7. The preliminary list of equipments and machineries requested is presented in Appendix 8.

(ii) Establishment of irrigation and agricultural management techniques when different cropping patterns are practised, e.g. main season with paddy cultivation and off-season with cultivation of upland crops.

(iii) Demonstration and supportive research for activities (i) and (ii) at demonstration farms and laboratory.

(iv) Training of Malaysian Counterparts and trainees on irrigation and agricultural management techniques. This will include development of methodologies and curriculum of training.

(v) Investigation, planning, design and operational guidance for all the above activities.

Minimum of one (1) pilot farms of about 20 hectares size will be constructed at nearby areas, each representing different water management concepts for selected upland crops. The following activities will be implemented:

(i) Investigation, planning, design and advice on the supervision works for the installation of irrigation, drainage, farm roads and other facilities in the pilot farms.

(ii) Introduction of water management and supportive research techniques, and on-the-job training for technical staff.

(iii) Guidance and advice to farmers in pilot farms for the introduction of water and agricultural manageemnt techniques.

(iv) Guidance and advice on the formation and operation of farmers water management organization.

8.2.2.3. Budgetary, Organization and Implementation Programme

During the initial two (2) years (April, 1988-March, 1990) of the cooperation period, the present organization and operational allocation of N.W.M.T.C. are sufficient to carry out the initial scope of preliminary groundworks. It is envisaged that

9/-

during this period, the J.I.C.A.'s experts will assist the Malaysian Counterparts in undertaking the planning and design of development works for campus, demonstration farm and pilot farm as outlined in para 8.2.2.2. above, and prepare the necessary estimate for submission for application of development allocation during the sixth (6th.) Malaysian Plan period (1991 - 1995). The schedule of submission of application is sometime at the end of year 1989. The development works are expected to be implemented in three (3) years period (1990 - 1992). During these period, the staff organization will be gradually expanded in line with the requirement of the Centres' new scope of involvement. The three (3) years period will also be tentatively the period of extension to the programme. In summary, the implementation plan and proposals are presented in Fig. 3.

9. FUTURE FUNCTION AND UTILIZATION

In outlining the future roles and utilization of N.W.M.T.C., the development programme for training and supportive facilities are presented together with budgetary programme in Fig. 3. It is envisaged that these functions and involvements will consist of the followings:

i) To provide the necessary training on the water management/ irrigation techniques at on-farm level for both crops; i.e. paddy and non-paddy (upland crop). The water management/ irrigation techniques for non-paddy (upland crop) shall include surface irrigation (namely furrow and border), overhead irrigation (sprinkler), and localized irrigation (trickle). These shall be combined with the proper agricultural management techniques at farm level including farm mechanization. Some subjects on the irrigation and production system for double-cropping of paddy will also be given.

ii) To provide improved training facilities including hostel, office, garage for farm machinery, classrooms, audio-visual equipments, etc. For purpose of training, supportive research and promoting the techniques; demonstration farms at the campus and pilot farms at nearby areas will be operated and maintained at optimum condition.

iii) To provide advisory services in the development of new schemes or rehabilitation of existing drainage and irrigation schemes. Advices also shall be rendered for development of pilot farms in other areas.

iv) To assist in promoting; a) extension programme in water management, and b) establishment of water management association at all levels of irrigation systems.

10/-

v) In undertaking activities (i) - (iv), N.W.M.T.C. shall establish technical cooperation and information exchange programmes with the eight (8) granaries; namely M.A.D.A., K.A.D.A., KERIAN-SG. MANIK, KEMASIN-SEMERAK, SEBERANG PERAK, SEBERANG PERAI, TANJONG KARANG and BESUT, and all D.I.D. states. Cooperation will also be established with the Authorities responsible for areas outside the major granaries.

vi) To undertake applied research programmes on water management where necessary, as supportive services for the training contents and curriculum. Applied research in the agricultural component shall be carried out in collaboration with M.A.R.D.I.. This will avoid duplication of efforts and activities.

vii) To establish and promote technical cooperation and information exchange programmes with the National and International Institutes in the similar field, amongst others; T.A.R.C. and N.R.I.A.E. in Japan, I.I.M.I. in Sri Lanka, I.L.R.I. in the Netherlands and I.R.R.I. in the Philipine.

viii) Scope of involvements and activities to be carried out in the N.W.M.T.C. in the field of research shall not overlap with those research works carried out in Ampang Research Station, whilst in the field of training, shall not duplicate the training curricula of the Staff's training centre at Ampang.

The National Agricultural Policy, enunciated in January 1984, provides the broad direction of development strategy for the agricultural sector as well as a long-term framework for its development up to the year 2000. In this connection, the policy stipulated that the modernization and production growth for the rice sector shall be focussed on the eight (8) major granaries, while for areas outside these granaries a programme of crop diversification will be promoted. The modernization thrust entails several dynamic processes, of which, irrigation water management and the related agricultural production system will be one of the most important element.

The future roles and utilization of N.W.M.T.C. as envisaged will closely follow the objectives and thrusts of the National Agricultural Policy. The centre will be a prominent National Institute of training and dissemination of knowledge in its areas of specialization.

10. STATUS OF N.W.M.T.C.

The important role that the Centre has played since its establishment and will continue to play in the future have not lacked recognition. The Director-General, Drainage and Irrigation Department Malaysia, presented a paper entitled 'Water Management Training in Malaysia' at the 13th. I.C.I.D. Congress in Rabat, Morocco in 1987, in which, it was acknowledged that the acquisition of water management training skill in Malaysia for paddy crops has been attributed to be enhanced largely due to the effort of N.W.M.T.C., (the synopsis of the paper attached).

Periodically from time to time, there have also been report in the local newspapers and Ministry of Agriculture's newsletter regarding the important works being carried out by the Centre. Some extracts are presented at the end of this report.

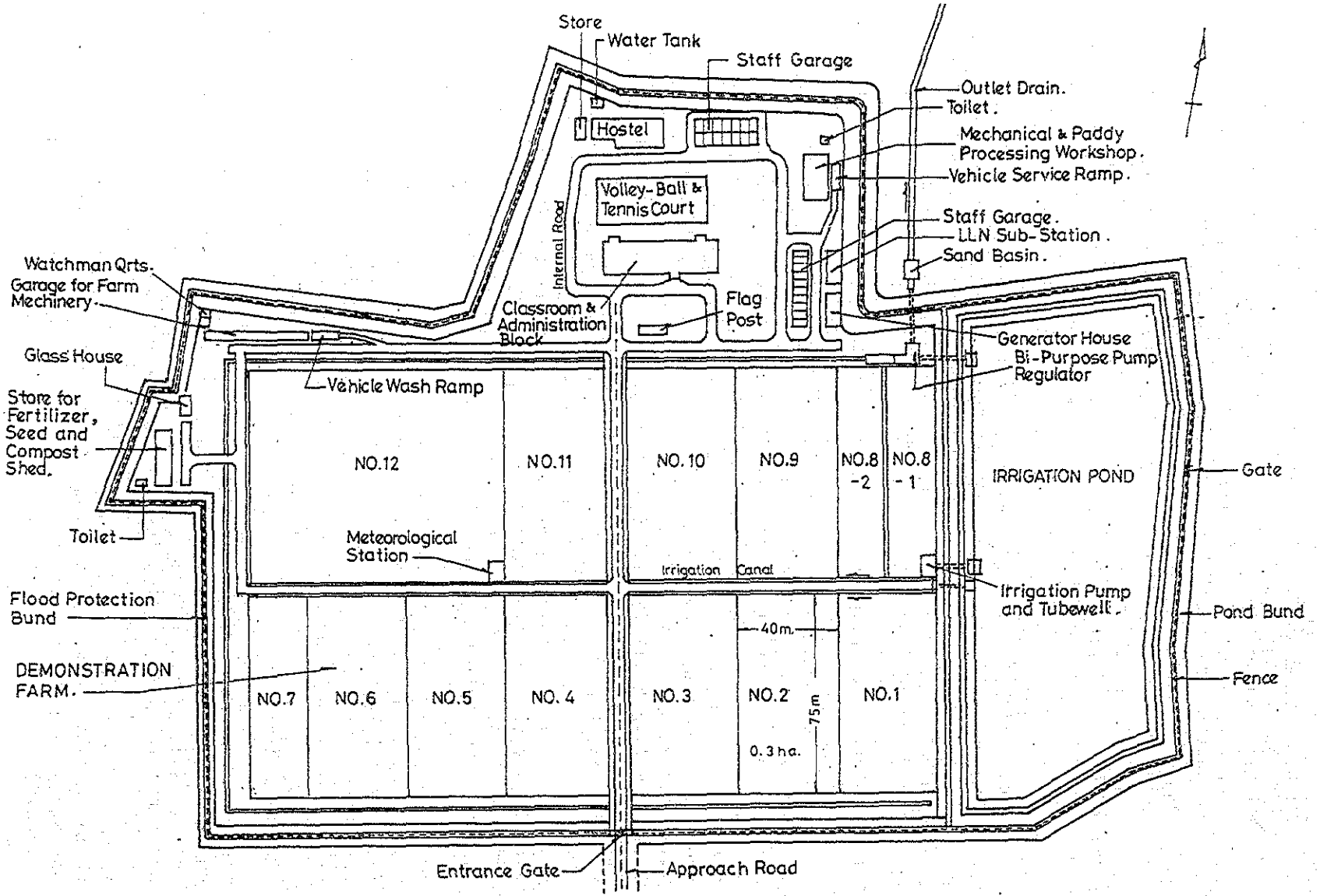


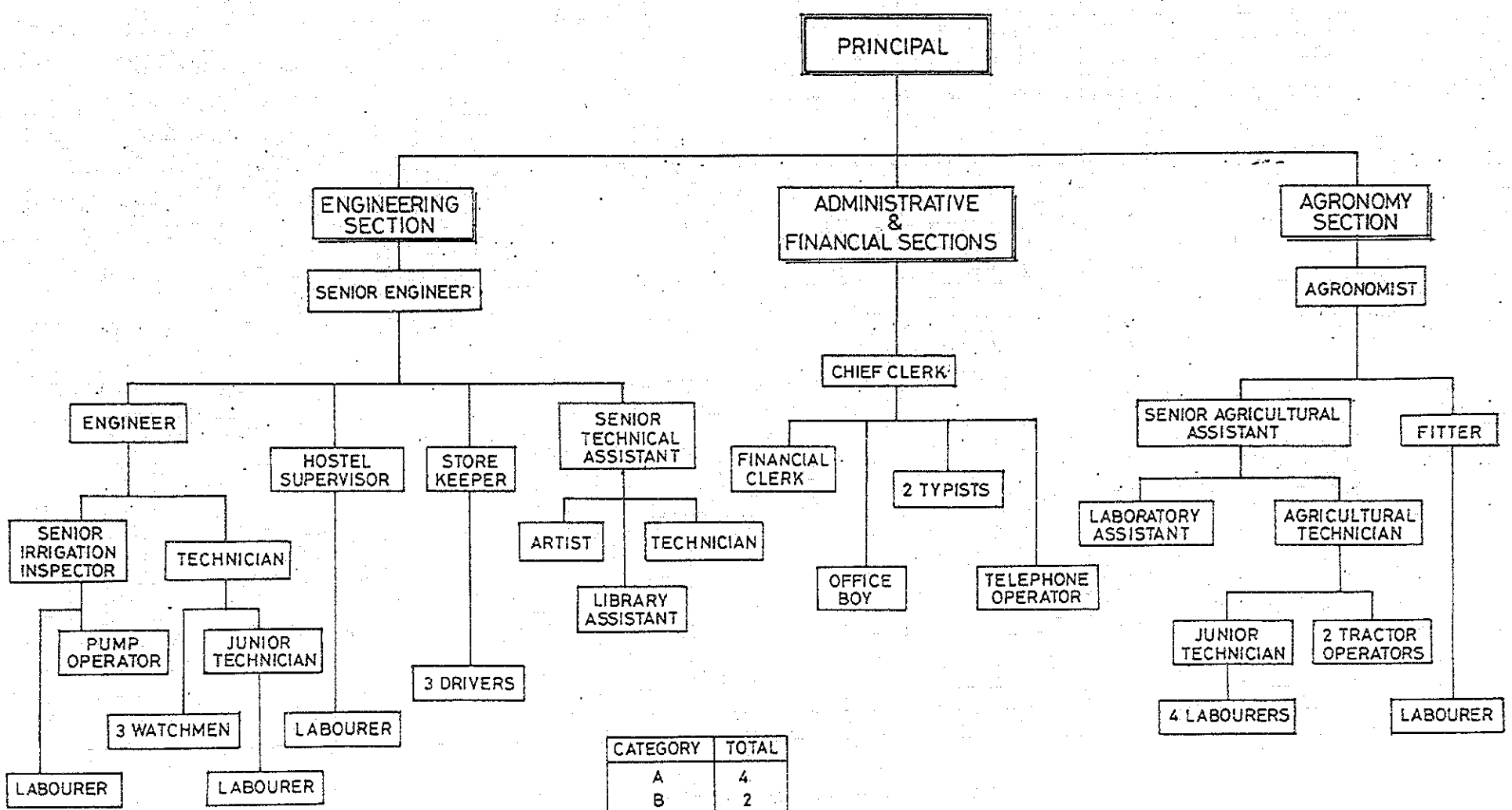
FIG. 1

NATIONAL WATER MANAGEMENT TRAINING CENTRE
LAYOUT PLAN

FIG. 2

NATIONAL WATER MANAGEMENT TRAINING CENTRE

ORGANISATION CHART 1988



CATEGORY	TOTAL
A	4
B	2
C	11
D	24
TOTAL :	41

FIG. 3: PROPOSED SCHEDULE OF DEVELOPMENT PROGRAMME OF NWMTC (1989 - 2000)

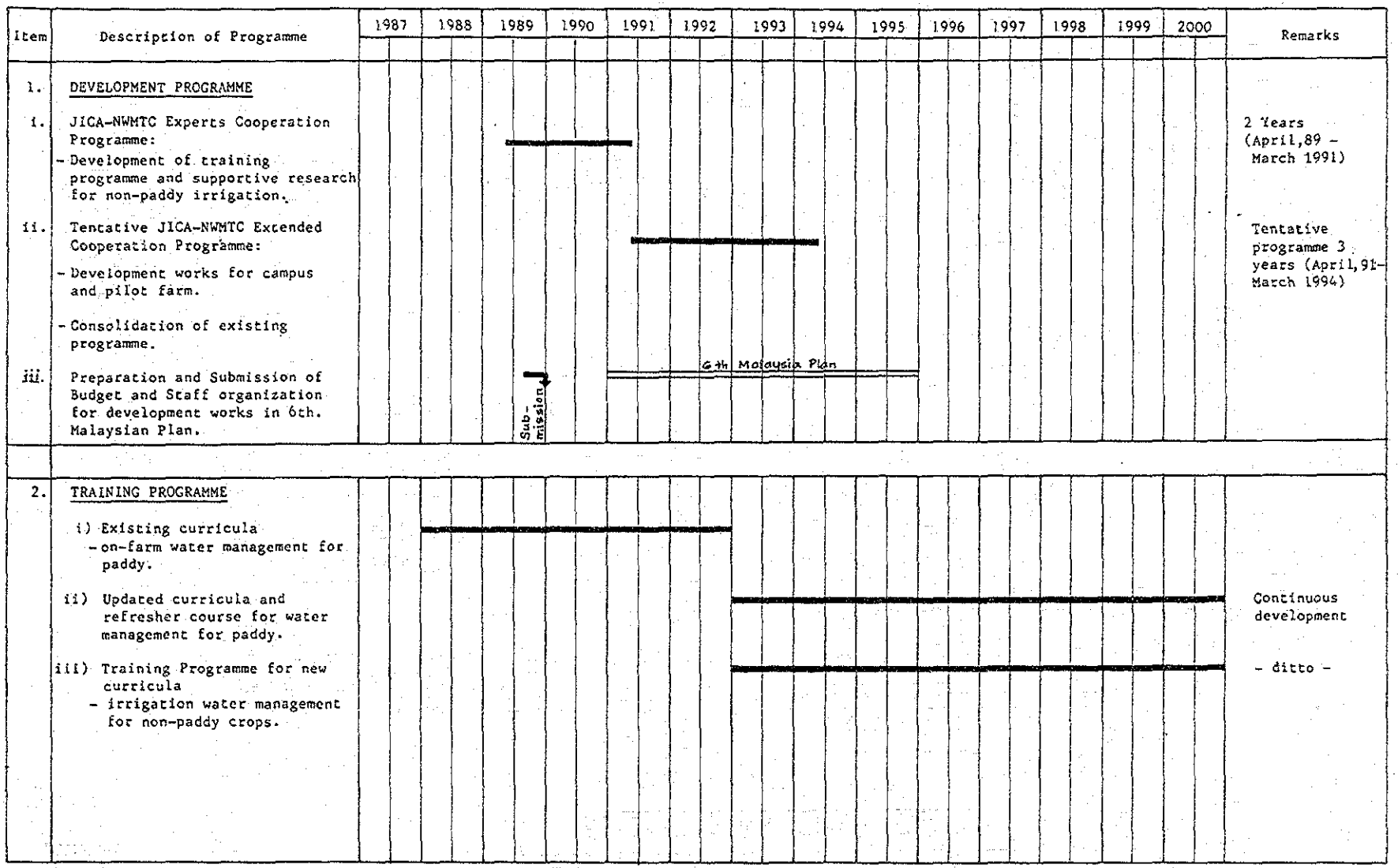


Table 1: COURSE MODULES

Module	Duration	Trainees	Qualification	Experince/Service	No. of Trainees/ Course	No. of Courses Per Year
1	2 weeks	Engineers/Agriculture Officers	Degree Holders	1 - 3 years	25	2
1A	1 week	Senior Engineers	- do -	more than 5 years	25	1
2A	2 weeks	Technical Assistants/ Agriculture Assistants	Diploma Holders	more than 3 years	25	1
2B	3 weeks	- do -	- do -	1 - 3 years	25	1
3A	4 weeks	Irrigation Inspectors/ Technicians	School Certificate Holders	more than 4 years	25	1
3B	8 weeks	- do -	- do -	1 - 4 years	25	1
4A	4 weeks	Irrigation Overseers/ Junior Technicians	Lower School Certificate Holders	more than 5 years	25	1
4B	8 weeks	- do -	- do -	2 - 5 years	25	1
5A	1 day	Farmers	-	-	30	4
5B	3 days	- do -	-	-	25	4

Table 2: Training Curricula for Course Module 3A

Trainees: Irrigation Inspector & Technician

Duration: 4 weeks

Subject	Contents	Lecture (Hrs.)	Demonstration/ Practice (Hrs.)	Study Tour (Hrs.)	Others* (Hrs.)	Total (Hrs.)
Irrigation and Drainage	Basic Concepts, Irrigation Development & Schemes in Malaysia, Planning/Design of Schemes, Drainage, Irrigation Areas Ordinance, etc.	10	–	–	5	15
Water Management	General Concepts, Water Management for Rice Cultivation, Planning, Design, Construction and O & M of Water Management Facilities, On-Farm Drainage, Social & Institutional Aspects, Extension, Land Consolidation, Case Studies, etc.	20	15	5	5	45
Rice Cultivation	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension, Farm Management, etc.	15	15	5	7	42
Basic Subjects	National Agricultural Policy, Islamic Values, Farming Sociology, Hydraulics, etc.	10	–	–	–	10
	Total (Hrs.)	55	30	10	17	112

* Others = Tutorials, Discussions, Tests, Library Studies, Film Shows, Miscellaneous, etc.

Table 3: No of Participants Trained During 1981 - 87

Course Participants \ Year	1981	1982	1983	1984	1985	1986	1987	Total
Engineers/A.O.	18	18	22	30	24	-	15	127
Technical Assistants/A.A.	23	19	22	11	59	28	12	174
Irrigation Inspectors/Technicians	29	14	15	10	24	52	52	196
Irrigation Overseers/Junior Technician	-	-	25	34	46	58	43	206
Farmers	78	15	30	46	70	152	40	431
Malian Engineers/Technicians	-	-	-	8	9	12	-	29

Table 4: No of Participants To Be Trained In 1988 - 1993

No of Participants \ Year	1988	1989	1990	1991	1992	1993	Present Status/Estimated Nos. of Staff in each category
Engineers/Agriculture Officer	25	25	* 25	N.T.	N.T.	N.T.	202
Technical Assistant/Agri. Assistant	-	25	25	25	* 25	N.T.	274
Irrigation Inspector/Technicians	70	100	100	100	100	* 125	791
Irrigation Overseer/Junior Technicians	29	50	50	50	* 75	N.T.	460
Farmers	100	100	100	100	100	100	-

Note

* Completed

N.T. No Trainees

Table 5: Breakdown of Expenditures Incurred by the Government of Malaysia

Year Items	1979 - 1981 M$	1982 M$	1983 M$	1984 M$	1985 M$	Total M$
Development:						
Training Centre	3,400.250	848.020	831.360	323.590	248.980	5,652.200
Pilot Farms	184.000	265.000	43.000	481.500	206.100	1,179.610
Operation	471.630	408.950	399.660	441.850	486.820	2,208.910
Total	4,055.880	1,521.970	1,274.020	1,246.940	941.910	9,040.720

Table 6: Breakdown of Expenditures Inccured by the Government of Japan

Year Items	1979 - 1981 M$	1982 M$	1983 M$	1984 M$	1985 M$	Total M$
Survey Team	406.970	69.490	24.770	80.120	N.A.	581.350*
Experts	1,600.990	460.530	454.190	357.980	N.A.	2,873.690*
Equipments/Machinery	2,109.720	257.620	364.830	372.440	N.A.	3,104.610*
Local Cost/Finance	616.270	37.500	52.800	61.250	N.A.	767.820*
Total	4,733.950	825.140	896.590	871.790	N.A.	7,327.470*

Table 7: Expenditures by the Malaysian Government and Japanese government in the Implementation of the NWMTC.

Year	1979 - 1981 M$	1982 M$	1983 M$	1984 M$	1985 M$	Total M$
Malaysian Government	4,055.880	1,521.970	1,274.020	1,246.940	941.910	9,040.720
Japanese Government	4,733.950	825.140	896.590	871.790	N.A.	7,327.470*
Total	8,789.830	2,347.110	2,170.610	2,118.730	941.910*	16,368.190*

Notes

M$ 1.00 = Y 100.00

* Total does not include expenditures for 1985 by Japanese Government.

Table 8: Approved Allocation and Actual Expenditures for Operation of NWMTC
(1986 - 1989)

Fiscal Year	Approved Allocation	Actual Expenditures
1986	623,680	530,633
1987	696,270	597,896
1988	667,800	on-going
1989	* 660,940	-

Note

* Submitted for approval

COURSE CURRICULUM:

COURSE FOR: Engineers and Agriculture Officers.
(Service: 1 - 3 years)

MODULE : M1

PERIOD : 56 Hours (2 weeks)

SUBEJCT	CODE	CONTENTS	LECT. HRS.	PRAC. HRS.	* OTHERS HRS.	TOTAL HRS.
IRRIGATION & DRAINAGE	ID					
WATER MANAGEMENT	WM	Irrigation Development/Schemes in Malaysia, Concepts of W/M, W/M for Rice Cultivation, Planning, Construction and O & M of W/M Facilities, Drainage, Social & Institutional Aspects of W/M, Land Consolidation, Case Studies of Pilot Farms, etc.	14	6	5	25
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension, etc.	12	8	3	23
GENERAL ENGINEERING	GE					
OTHER SUBJECTS	OS	Farming Community & Related Sociology Agricultural Policy, Islamic Values, etc.	5	-	-	5
COURSE PROJECTS	CP					
MISCELLA-NEOUS **	MS					3
TOTAL (HRS.)			(31)	(14)	(8)	56

* Others = Tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Tests, Exams, Library Study etc.

COURSE CURRICULUM:

COURSE FOR: Technical Assistants and Agriculture Assistants. (Services: More than 3 years)

MODULE : M2A

PERIOD : 56 Hours (2 weeks)

SUBJECT	CODE	CONTENTS	LECT. HRS.	PRAC. HRS.	OTHERS * HRS.	TOTAL HRS.
IRRIGATION & DRAINAGE	ID					
WATER MANAGEMENT	WM	Irrigation Development/Schemes in Malaysia, Concepts of W/M, W/M for Rice Cultivation, Planning, Construction and O & M of W/M Facilities, Drainage, Social & Institutional Aspects of W/M, Land Consolidation, Case Studies of Pilot Farms, etc.	14	6	5	25
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension, etc.	12	8	3	23
GENERAL ENGINEERING	GE					
OTHER SUBJECTS	OS	Farming Community & Related Sociology Agricultural Policy, Islamic Values, etc.	5	-	-	5
COURSE PROJECTS	CP					
MISCELLA-NEOUS **	MS					3
TOTAL (HRS.)			(31)	(14)	(8)	56

* Others = Tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Tests, Exams, Library Study etc.

COURSE CURRICULUM:

COURSE FOR: Technical Assistants and Agriculture Assistants.
(Service: 1 - 3 years)

MODULE : M2B

PERIOD : 84 Hours (3 weeks)

SUBJECT	CODE	CONTENTS	LECT. HRS.	PRAC. HRS.	OTHERS* HRS.	TOTAL HRS.
IRRIGATION & DRAINAGE	ID	Basic concepts, Irrigation Development & Schemes in Malaysia, Planning/Design of Schemes, Drainage, Irrigation Areas Ordinance, etc.	8	-	-	8
WATER MANAGEMENT	WM	General Concepts, W/M for Rice Cultivation, Planning, Design, Construction and O & M of W/M Facilities, On-Farm Drainage Social & Institutional Aspects of W/M, W/M Extension, Case Studies on Pilot Farms, Land Consolidation, etc.	15	8	7	30
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension etc.	12	10	8	30
GENERAL ENGINEERING	GE					
OTHER SUBJECTS	OS	Farming Community & Related Sociology, Flow Measurement and Rice Farming & Water Management Practice in Japan, Agricultural Policy, Islamic values, etc.	9	3	-	12
COURSE PROJECTS	CP					
MISCELLANEOUS **	MS					
TOTAL (HRS.)			(44)	(21)	(15)	84

* Others = tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Tests, Exams, Library Study etc.

COURSE CURRICULUM:

COURSE FOR: Irrigation Inspectors and Technicians.
(Service: More than 4 years)

MODULE : M3A

PERIOD : 112 Hours (4 weeks)

SUBJECT	CODE	CONTENTS	LECT. HRS.	PRAC. HRS.	OTHERS* HRS.	TOTAL HRS.
IRRIGATION & DRAINAGE	ID	Basic Concepts, Irrigation Development & Schemes in Malaysia, Planning/Design of Schemes, Drainage, Irrigation Areas Ordinance, etc.	9	-	5	14
WATER MANAGEMENT	WM	General Concepts, W/M for Rice Cultivation, Planning, Design, Construction and O & M of W/M Facilities, On-Farm Drainage Social & Institutional Aspects of W/M, W/M Extension, Case Studies on Pilot Farms, Land Consolidation, etc.	20	15	7	42
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension, Farm Management, etc.	16	14	10	40
GENERAL ENGINEERING	GE					
OTHER SUBJECTS	OS	Farming Community & Related Sociology, Flow Measurements, Levelling, Agricultural Policy, Islamic Values, etc.	10	-	-	10
COURSE PROJECTS	CP					
MISCELLANEOUS **	MS					6
TOTAL (HRS.)			(55)	(29)	(23)	112

* Others = Tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Tests, Exams, Library Study etc.

COURSE CURRICULUM:

COURSE FOR: Irrigation Inspectors and Technicians.
(Service: 1 - 4 Years)

MODULE : M3B

PERIOD : 280 Hours (10 weeks)

SUBJECT	CODE	CONTENTS	LECT. HRS.	PRAC. HRS.	OTHERS* HRS.	TOTAL HRS.
IRRIGATION & DRAINAGE	ID	Basic Concepts, Irrigation Development & Schemes in Malaysia, Planning/Design of Schemes, Drainage, Irrigation Areas Ordinance, Irrigation/Drainage Pumps, Irrigation Efficiency, FArm Roads, etc.	24	4	12	40
WATER MANAGEMENT	WM	General Concepts, W/M for Rice Cultivation, Planning, Design, Construction and O & M of W/M Facilities, On-Farm Drainage Social & Institutional Aspects of W/M, W/M Extension, Case Studies on Pilot Farms, Land Consolidation etc.	18	10	12	40
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertilizer Application, Crop Protection, Farm Mechanisation, Agricultural Extension etc.	18	10	12	40
GENERAL ENGINEERING	GE	Related Mathematics, Simple Hydraulics, Surveying, Construction, Flow Measurement, Estimation & Costing, etc.	60	20	20	100
OTHER SUBJECTS	OS	General Orders, Contract Administration, Farming Community & Related Sociology, Agricultural Policy, Islamic Values, etc.	10	-	-	10
COURSE PROJECTS	CP	Field Studies, Data Analysis, Report Writing, Presentation, etc.	-	10	-	10
MISCELLANEOUS **	MS		-	-	-	40
TOTAL (HRS.)			(130)	(54)	(56)	280

* Others = Tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Test, Exams, Library Study etc.

COURSE CURRICULUM:

COURSE FOR: Irrigation Overseer and Junior Technician (Service: More than 5 years)

MODULE : M4A

PERIOD : 112 Hours (4 weeks)

SUBJECT	CODE	CONTENTS	LECT. HRS	PRAC. HRS	OTHERS* HRS	TOTAL HRS
IRRIGATION & DRAINAGE	ID	Basic Concepts, Irrigation Development & Schemes in Malaysia, Planning/Design of Schemes, Drainage, Irrigation Areas Ordinance, etc.	9	-	5	14
WATER MANAGEMENT	WM	General Concepts, W/M for Rice Cultivation, Planning, Design, Construction and O & M of W/M Facilities, On-Farm Drainage, Social & Institutional Aspects of W/M, W/M Extension, Case Studies on Pilot Farms, Land Consolidation, etc.	20	15	7	42
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension, Farm Management, etc.	16	14	10	40
GENERAL ENGINEERING	GE					
OTHER SUBJECTS	OS	Farming Community & Related Sociology, Flow Measurements, Levelling, Agricultural Policy, Islamic Values, etc.	10	-	-	10
COURSE PROJECTS	CP					
MISCELLANEOUS **	MS					6
TOTAL (HRS.)			(55)	(29)	(22)	112

* Others = Tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Tests, Exams, Library Study etc.

COURSE CURRICULUM:

COURSE FOR: Irrigation Overseers and Junior Technicians. (Service: 2 - 5 years)

MODULE : M4B

PERIOD : 224 Hours (8 weeks)

SUBJECT	CODE	CONTENTS	LECT. HRS.	PRAC. HRS.	OTHERS* HRS.	TOTAL HRS.
IRRIGATION & DRAINAGE	ID	Basic concepts, Irrigation Development & Schemes in Malaysia, Planning/Design of Schemes, Drainage, Irrigation Areas Ordinance, Irrigation/Drainage Pumps, Irrigation Efficiency, Farm Roads, etc.	15	5	10	30
WATER MANAGEMENT	WM	General Concepts, W/M for Rice Cultivation, Planning, Design, Construction and O & M of W/M Facilities, On-Farm Drainage Social & Institutional Aspects of W/M, W/M Extension, Case Studies on Pilot Farms, Land Consolidation, etc.	25	15	10	50
RICE CULTIVATION	RC	Morphology/Growth of Padi Plant, Cultural Practices in Malaysia, Fertiliser Application, Crop Protection, Farm Mechanisation, Agricultural Extension etc.	20	20	15	55
GENERAL ENGINEERING	GE	Related Mathematics, Surveying, Simple Hydraulics, Flow Measurement, Estimation & Costing, etc.	20	10	10	40
OTHER SUBJECTS	OS	General Orders, Contract Administration, Soil Mechanics, Concrete Works, Excavation, Agricultural Policy, Islamic Values, Farming Community, etc.	15	-	-	15
COURSE PROJECTS	CP	Field Studies, Analysis of Data/Results, Report Writing, Presentation, etc.	-	10	10	20
MISCELLANEOUS **	MS		-	-	-	14
TOTAL (HRS.)			(95)	(60)	(55)	224

* Others = Tutorials, Discussions, Project Visit, Movies etc.

** Miscelleneous = Course Introduction & Closing, Test, Exams, Library Study etc.

STATUS OF DEMONSTRATION AND PILOT FARMS. AN ENGINEERING REPORT

Demonstration Farm

An important training facility at the center is the demonstration farm. This farm covers an area of 4.6 hectres and comprises 9 standard farm lots of approximately 0.3 ha. each (75m x 40m) and 3 other farm lots having different dimensions. It is self supporting with the provision of a storage pond, irrigation and drainage systems as well as farm roads. The water required for its cultivation is either obtained from the irrigation pond, ground water or available rainfall. The layout of the facilities in the demonstration farm is shown in **figure 1**.

The demonstration farm is used by the trainees for field works in rice cultivation. In addition, it also serves as a test plot to conduct experiments or field studies on water supply and its distribution to padi fields for the development of good water management techniques.

The details of the demonstration farm facilities are as follows:

1.0 Farm Area.

Area of 4.6 hectres is devided into 12 independent lot as follows:

Lot Nos.1,2,3,4,5,6,9,10 and 11 is 0.344 hectre each.
Lot No. 7, 8 and 12 are 0.19 ha., 0.24 ha. and 0.72 ha. respectively.
All the lots are consolidated fields except for lot no. 12 of which was left to its original/traditional shape and condition.

2.0 Irrigation Facilities.

2.1 Irrigation pond:

Pond Area: 1.82 ha.
Catchment Area: 1.9 ha.
Effective Capacity: 49,800 cu.m. (at HWL + 4.30)
Dead Capacity: 2500 cu.m. (at LWL + 1.10)

2.2 Irrigation Pump: (extracting water from the pond).

Type: Single suction volute pump
Bore : 65 mm
Motor Output: 0.75 kW/unit, 50 HZ, 4P/1500 rpm.
Capacity: 5 lit./sec./unit
Total Head: 4 m.
No. of unit: 2.

I

2.3 Tubewell Submersible pump: (extracting ground water).

Type: Submersible motor pump.
Bore: 65 mm
Motor Output: 1.5 kW, 50 HZ, 2P/3000 rpm.
Capacity: 4 lit./sec./unit.
Total Head: 10.5 m.
No. of unit: 1

2.4 Irrigation Canal.

Construction: Rectangular (0.3m by 0.5m) cast in situ concrete canal laid in the middle of farm area.
Length: 360m.
Max. Capacity: 10.5 lit./sec.
Water Depth: 20 cm.
Field offtake: Orifice valve with measuring rec. weir.

3.0 Drainage Facilities

3.1 Bi-Purpose Pump. (used to recycle drainage water from main drain to the pond or to discharge out excess water from the center).

Type: Vertical shaft centrifugal pump (double layer).
Bore: 250 mm.
Motor Output: 7.5 kW, 50 Hz, 8P/750 rpm.
Capacity: 104 lit./sec./unit
All. Head: 4.4 m.
No. of unit: 2

3.2 Main Drain.

Construction: Trapezoidal shape earth drain
bottom width: 1 m.
side slope: 1:1.5
Bed gradient: 1: 5000
Max.Water depth: 1.9m.

3.3 Farm Road. (metal road)

Length: 231 m.
width: 4 m.

4.0 Others.

- Tractor access to field.
- Drainage outlets for each lot.
- Water measuring facilities in canal system.
- Two lots (No.2 and No.3) had been installed with sub-surface drainage system. The details are described below and as shown in **Table. 8**

5.0 Construction of sub-surface drainage

Pipes

i) Corrugated Vinyl pipe (with small hole, for lateral drainage).
ii) Hard vinyl pipe (for collecting drain)
iii) Joint
iv) Cap
v) Relief Well (Vertical type)

Depth of Lateral Pipe.

0.75 - 1.00 m (from padi field level to bottom of trentch)

Interval of the lateral pipe.

D/F Lot No. 2	8m x 5 lines
D/F Lot No. 3	5m x 8 lines

Interval of Mole Drain (if necessary-by using vibratory sub-soiler).

D/F Lot No. 2	8m x 5 lines
D/F Lot No. 3	5m x 8 lines

□□□□□□□□

Pilot Farms

Beside the above facilities in Demonstration farm, 4 pilot farms are attached to the center as its training facilities. The basic objective of the pilot farms is to provide practical examples to farmers and trainees on improved water management and rice cultivation. The farms which are located in the KADA area, are as follows:

i) Pilot Farm No.1 at Tunjung (18 ha.)
ii) Pilot Farm No.2 at Kadok (13 ha.)
iii) Pilot Farm No. 3 at Seberang Lating (10 ha.)
iv) Pilot Farm No. 4 at Padang Lindong (18 ha.)

Each of the pilot farm represent a model of a particular concept of water management and has been consructed with on-farm facilities such as irrigation and drainage sistem as well as a network of farm roads. Main features of the pilot farms are shown in **Table A.**

The water management concept regarding the proposed activities of the pilot farms are described as follows:

1.0 Different Methods of On-farm Development

Method of on-farm water management may be variable corresponding to the on-farm facilities constructed. In order to know the most suitable water management method under various on-farm developments, the following two different methods of on-farm development have been basically set up for the construction of the four Pilot Farms.

1.1 On-farm development without the adjustment of lots

Existing lot to lot irrigation still remains. However, the area is divided into several field blocks and field canals are provided so as to convey the irrigation water to each field block. At the head of each field block, a field off-take is to be installed. Thus, an area commanded by each field off-take becomes much less than the existing 20 ha.

In order to drain off excessive water due to heavy rainfall or over-irrigation from the field block, field drains are to be provided. In addition to the above, farm roads are also to be constructed to make an easy access to each field block/lot. A typical farm layout of on-farm development of this type is shown in **Fig.2.,3 and 5.**

On-farm development of the Pilot Farm No.1, 2 and 4 corresponds to this category. For the purpose of comparison, density of field canals and drains as well as materials for canals have been altered in each Pilot Farm.

1.2 On-farm development with the adjustment of lots

The existing irregular lot is to be readjusted. A field canal is furnished on the shorter side of each lot, and a drainage canal on the opposite side. Each lot has an individual field offtake and outlet. Thus, the water management at on-farm level can be carried out independently lot by lot.

Farm roads are built so closely that each lot is easily accessible. Normally, this type of on-farm development includes the movement of earth for land levelling and the readjustment of lots. The typical farm layout of this type of on-farm development is shown in **Fig.4.** The Pilot Farm No.3 represents this type of on-farm development.

2.0 Size of Field Block

Exsisting irrigation schemes in Malaysia are generally provided with irrigation facilities ending at an off-take, which commands about 20 ha of farm land on the average. From the off-take, water is distributed from lot to lot, resulting in inefficiency and delay in the distribution of water in the farms. Thus, the provision of on-farm facilities and water management techniques attracts keen interest in the present and future agricultural development in Malaysia.

First of all, it will be necessary to decrease an area commanded by one off-take, which is called hereafter as a field block. The pilot farm area is divided into several field blocks with almost the same land area. The size of a field block will influence the performance of water distribution in a pilot farm area as well as the construction cost. When the size of field block area becomes less, the construction cost for on-farm facilities will increase and generally the water distribution to each lot becomes easier. For the purpose of comparison, the following size of field block is selected for each Pilot Farm.

Pilot Farms	Nos of field blocks	Average land area of field block
No. 1	4	4.28 ha
No. 2	10	1.33 ha
No. 3	51	0.19 ha (lot size)
No.4	7	2.57 ha

3.0 Provision of On-farm Canals

In order to control the water movement in pilot farms, it is necessary to provide small on-farm canals; one is for irrigation and the other is for drainage. The former is named as a field canal and the latter as a field drain. The operation and maintenance of such canals will be much affected by the materials used. With the above considerations, various types of canals are introduced for the design of canals.

3.1 The U-shape flume canal

It was installed in the Pilot Farm No.1. In case of such precast concrete type canals, the construction is easy and fast. However, special attention should be paid in jointing the sections. In case the joints are not properly connected, the leakage of water from the joints occurs and much repairing work will be required.

3.2 The cast-in-place concrete type canal

It was facilitated in the Pilot Farm No.2 and a part of the Pilot Farm No.3. This type of canal is reinforced by steel bars and is durable. Water velocity in the canal is allowable up to 1.5 m/sec. Thus the required canal area can be reduced considerably. The maintenance cost will be less than any other open type canals. However, the construction cost will be expensive.

3.3 The pipe line system

It was introduced in a part of the field canals in Pilot Farm No.3. Generally, the pipe line system is costly, but it has many advantages compared with open canals. The main ones are summarized below.

a. Almost no maintenance work is required.
b. Land acquisition is not necessary for the installation.
c. Installation is not affected by any topographic conditions.
d. Conveyance losses are less than open canals.
e. Water management can be made easily.

In an area with much undulations, the introduction of the pipe line system is recommended if the hydraulic head is high enough to suply the water to the area. In the case of Pilot Farm No.3, the upstream area is lower than the downstream area. When the open canal is selected, the access to lots becomes very difficult in the upstream half because the canal embankment would be located at a high level. Accordingly, the pipe line system was adopted in the upstream half of the area.

3.4 The earth type canal

It was planned in Pilot farm No.4. This canal type should be adopted in case the original ground is composed of clayey soil with less permeability. The construction cost is the cheapest. However, the canal embankment is easily eroded by rainfall and damaged by rats or buffaloes. The maintenace cost as well as land acquisition cost becomes expensive.

All the field canals were equipped with sluice gates at turn-out to enable proper water distribution. The type of canal should be determined by taking both intial construction and maintenance cost into account.

Under prevailing conditions in Malaysia, the provision of drainage canals will not be so advantageous until the river flood control is completed. Consequently, all the field drains in Pilot Farms were made of earth. At the downstream end of each field drain, a sluice gate was installed to keep water in the field drain at a suitable level.

4.0 Provision of Farm Road

In order to save labor for farming practices, mechanized paddy cultivation will be widely introduced in Malaysia in the near future. For the easy access of machinery to lots, the provision of farm roads is definitely necessary. In addition to this, farm roads play the following role:

- Transportation of agricultural input and output.
- Easy approach to on-farm facilities for operation and maintenance.
- The road is not only for agricultural purposes but also for use by the villagers.

Taking the vital role of farm roads into account, a farm road 3 metres wide was built in each Pilot Farm area.

□□□□□□□□

Table A. Main Features of Pilot Farms

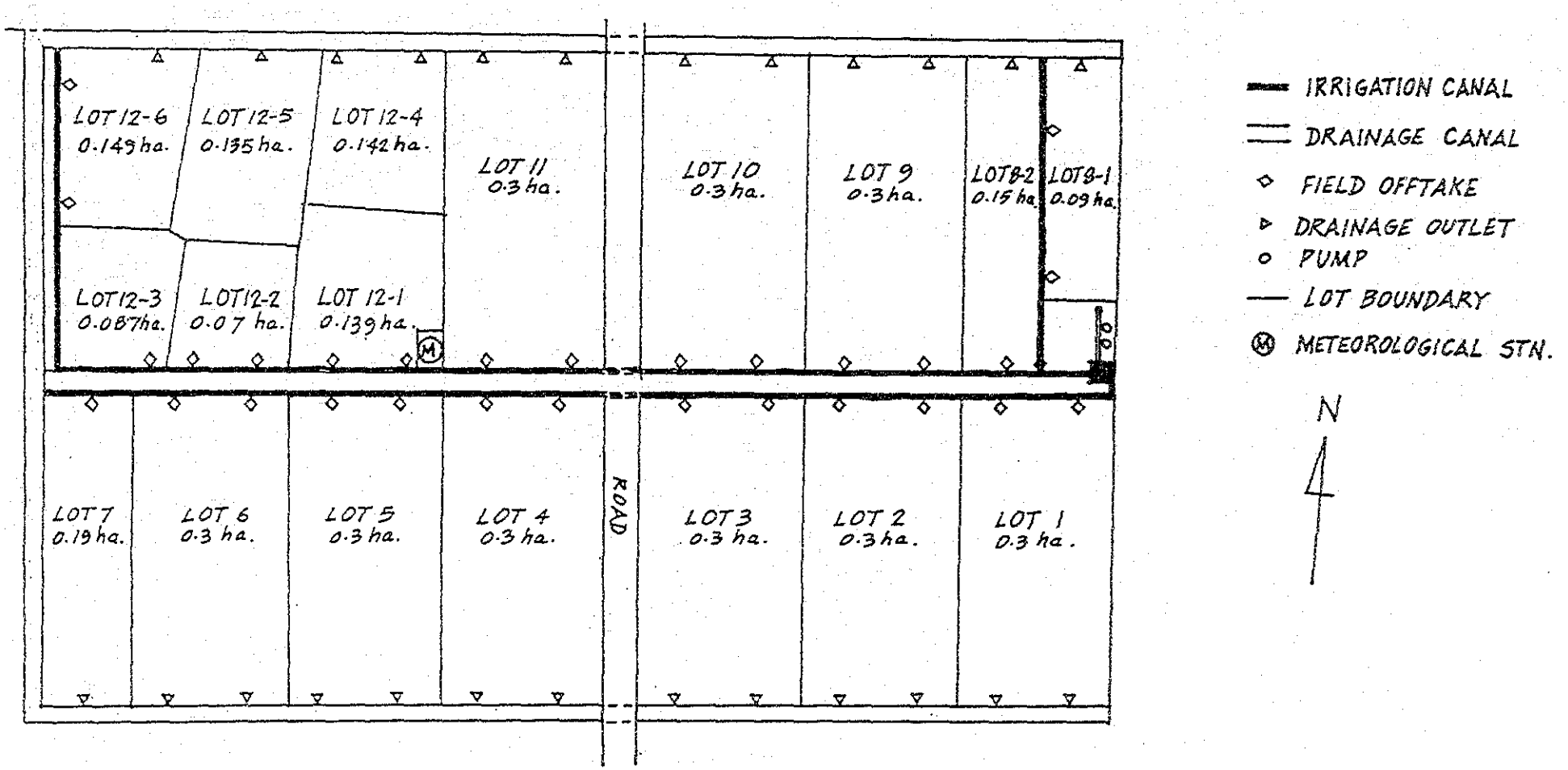
ITEMS	Unit	P/F No.1	P/F No.2	P/F No.3	P/F No.4
Irrigation scheme		**Kemubu**	**Kemubu**	**Kemubu**	**Pasir Mas**
Name of off-take		P3T1S6K	P453L	P23L	No.1&3
Total area	(ha)	18.08	13.27	10.60	18.02
Irrigated area	(ha)	17.13	13.27	9.63	18.02
Designed discharge					
Presaturation period	(l/sec)	30.0	50.0	40.0	60.0
Normal period	(l/sec)	14.0	11.0	8.0	14.4
Planned period for presaturation	(days)	20	9	6	9
Total F.canal length	**(m)**	**1168.0**	**760.0**	**1346.0**	**926.0**
Density of F.canal	(m/ha)	65.0	54.0	127.0	51.0
Total drain length	**(m)**	**1291.0**	**696.0**	**1499.0**	**1037.0**
Density of drain	(m/ha)	71.0	52.0	141.0	58.0
Total F.road length	**(m)**	**1677.0**	**429.0**	**1498.0**	**1258.0**
Width of F. road	(m)	3.0	4.0	3.0	3-3.5
Density of F.road	(m/ha)	93.0	32.0	141.0	70.0
Type of canal		**U-shaped concrete**	**Cast in-situ concrete**	**Cast in-situ con.& asb.pipe**	**Earth**
Nos. of irrigation block		4	8	8	7
Nos. of field off-take		8	10	51	7
Max. irrigation block	(ha)	3.18	2.01	0.34	3.04
Min. irrigation block	(ha)	1.39	0.77	0.07	2.24

Table. B. Parts Name and Numbers for Sub-surface Pipe

Name	Lot No.2	Lot No.3	Total	Remark
Water absorbtⁿ conduit (m)	353.5	550.0	903.5	65NC
Collecting conduit (m)	34.6	38.6	73.2	VU75
Total	388.1	588.6	976.7	-
Corrugated chease	1	2	3	75LT
corrugated chease	2	4	6	75x65LT
corrugated elbow	2	2	4	75LL
Increaser	7	8	15	75x65IN
Socket	9	12	21	65DVx65CPN
Horizontal relief well	2	2	4	VU75
Others	corrugated cap 13			

NATIONAL WATER MANAGEMENT TRAINING CENTRE

Figure 1. General Layout of Demonstration Farm



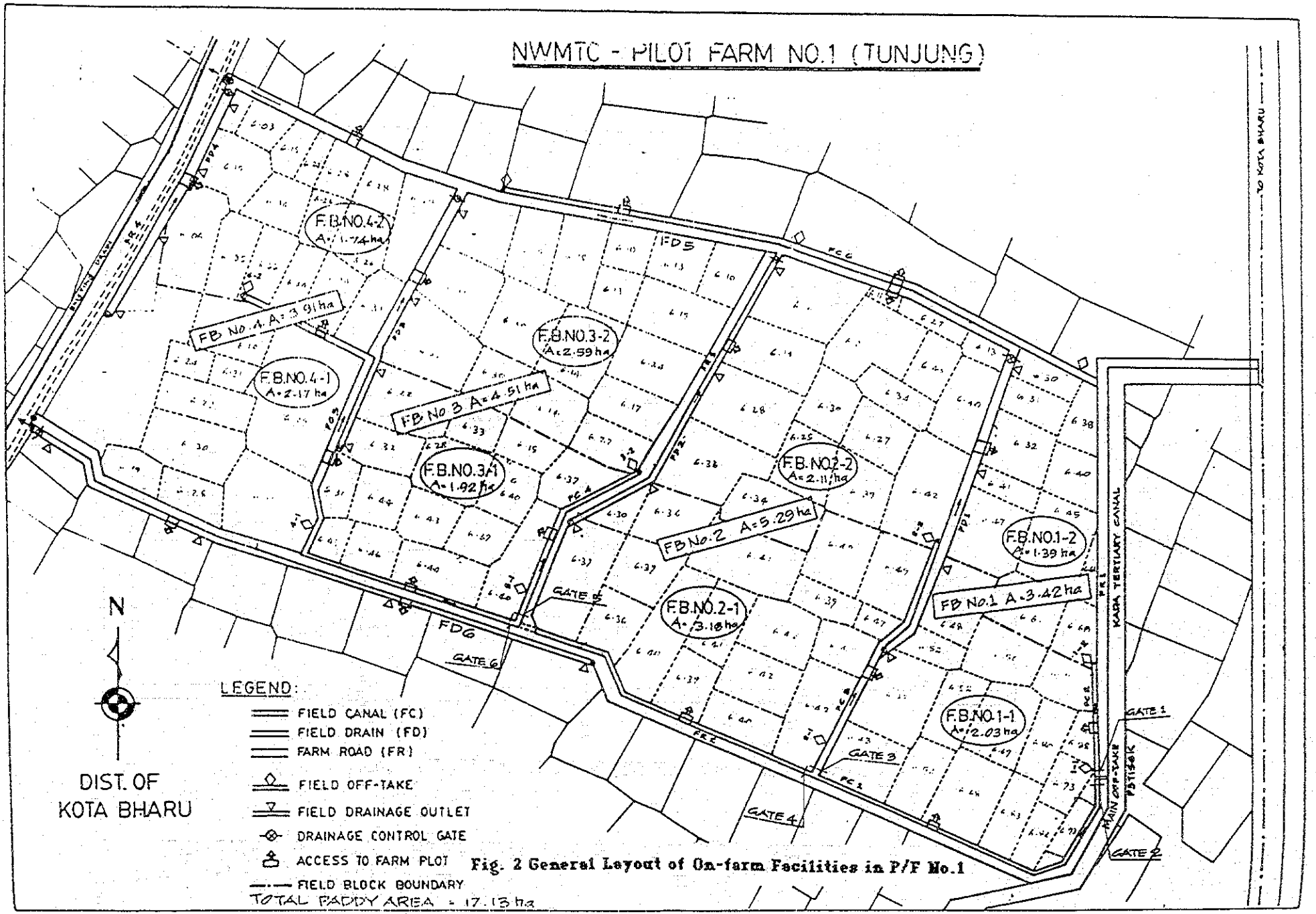


Fig. 2 General Layout of On-farm Facilities in P/F No.1

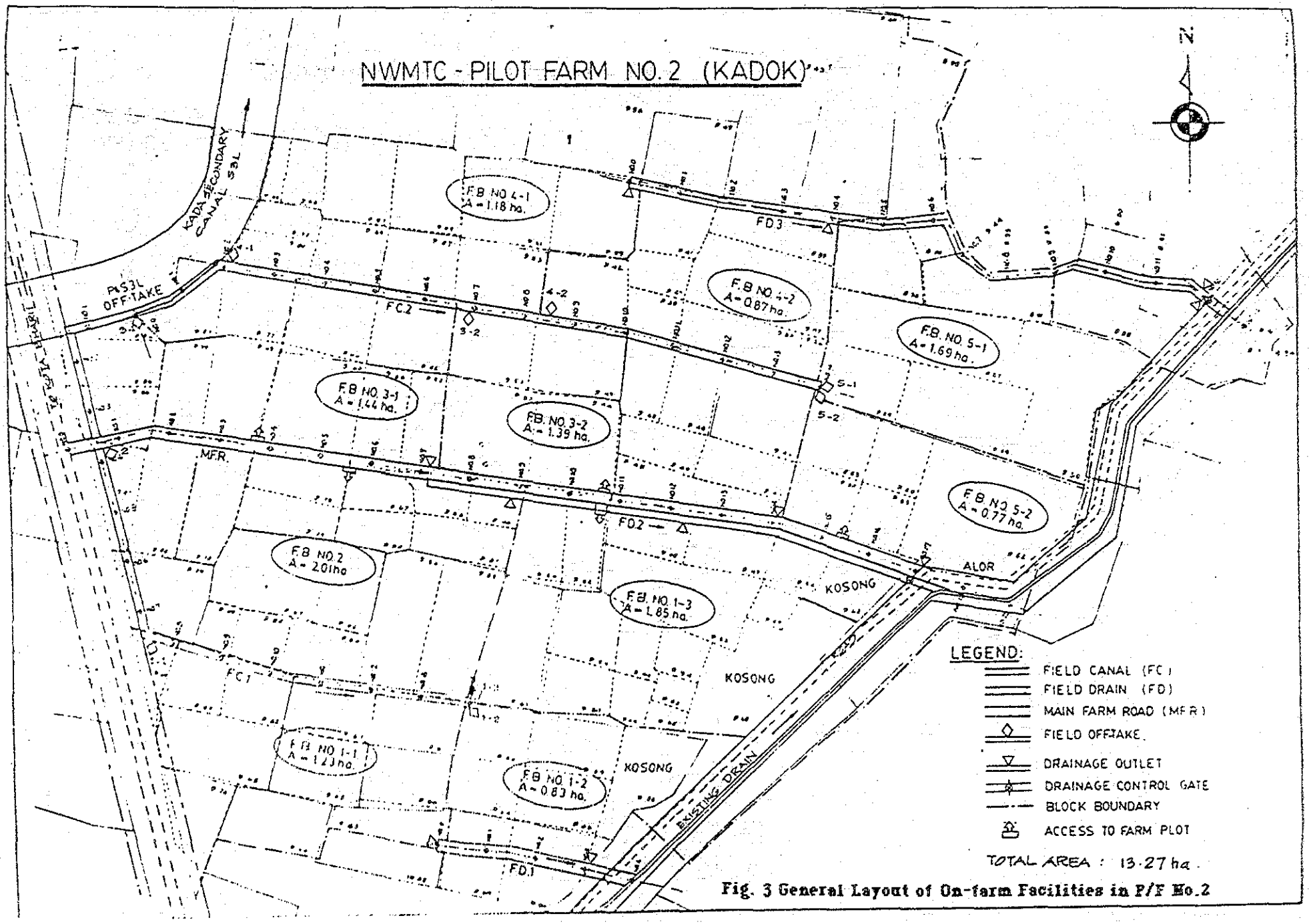


Fig. 3 General Layout of On-farm Facilities in P/F No.2

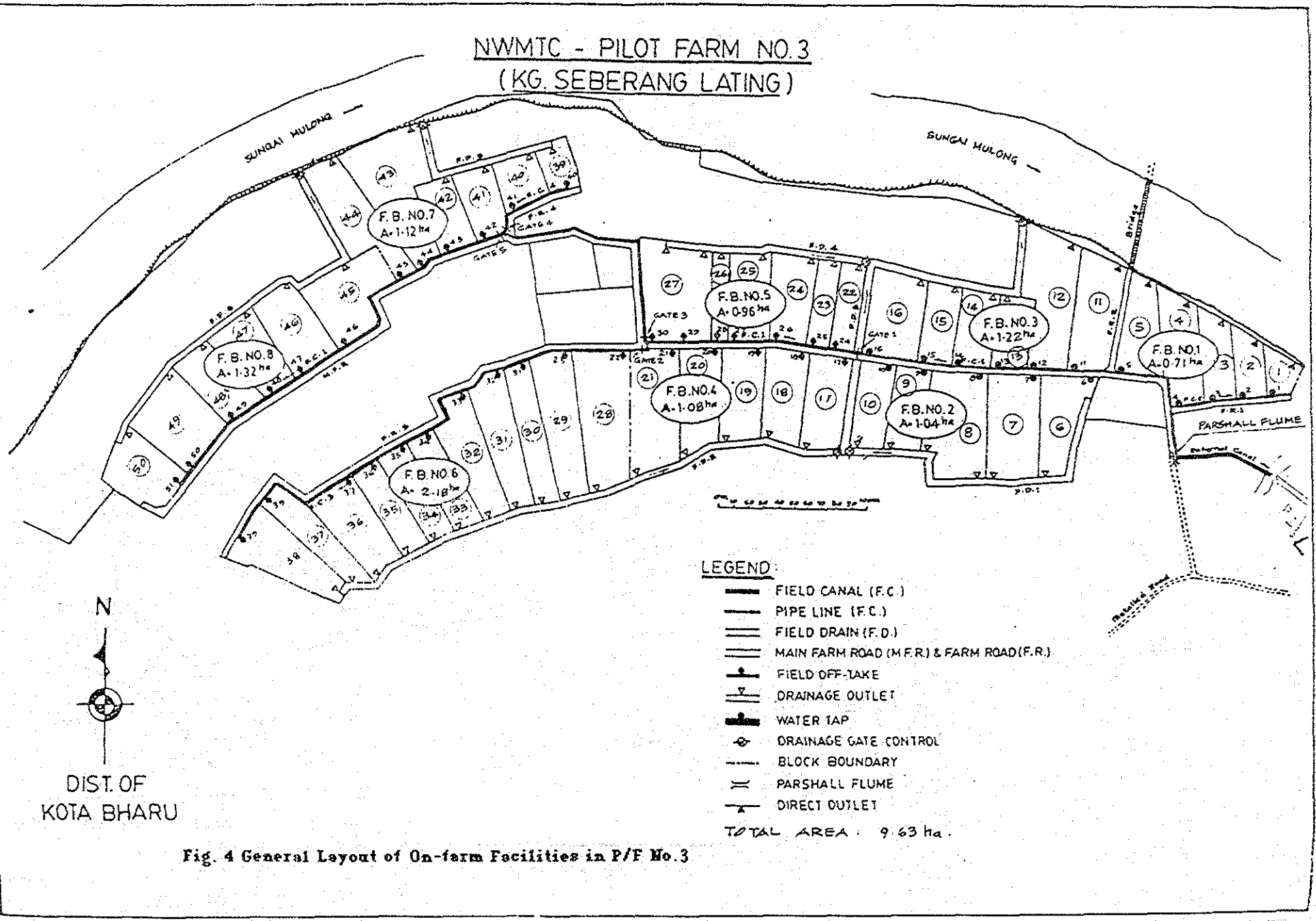


Fig. 4 General Layout of On-farm Facilities in P/F No.3

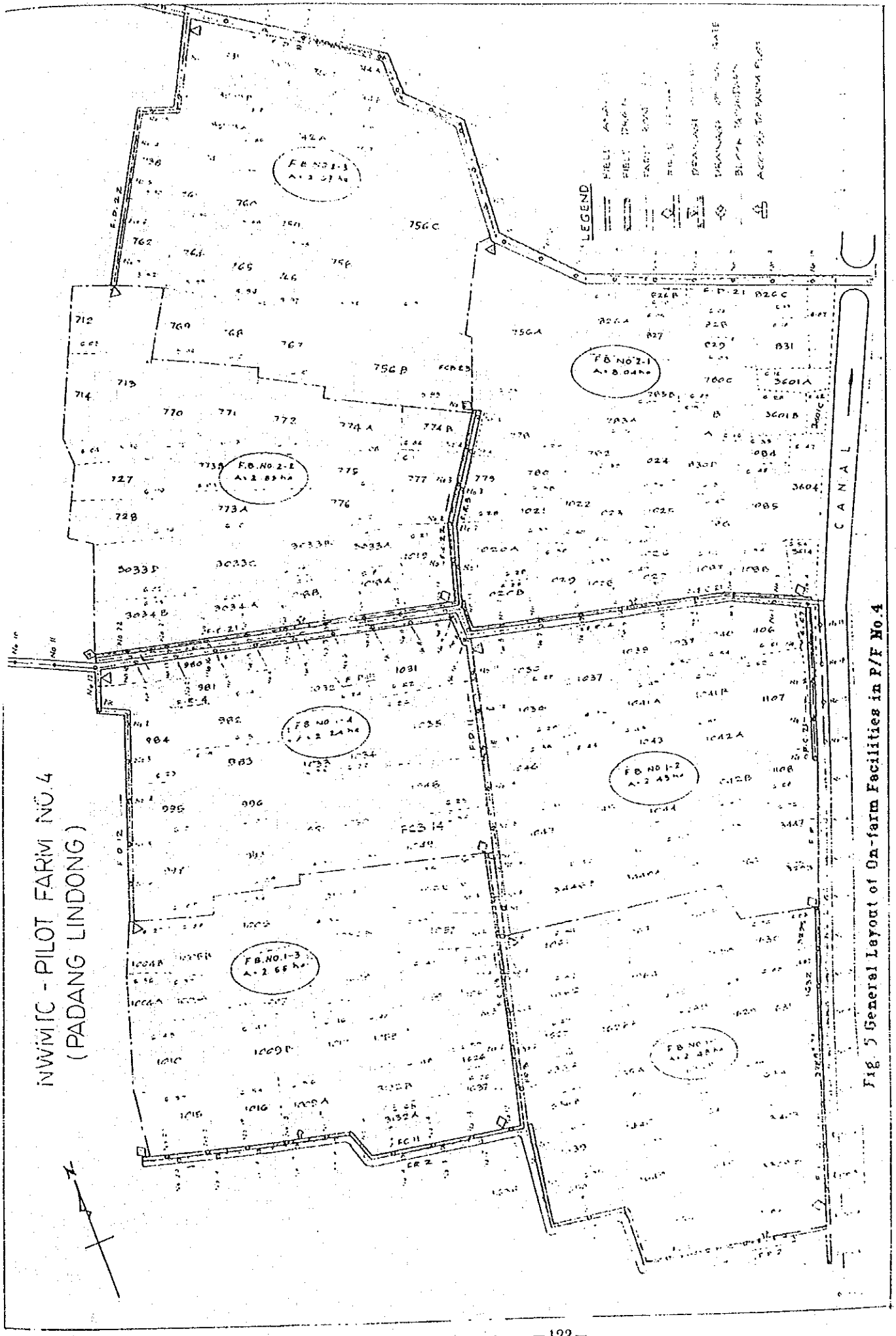


Fig. 5 General Layout of On-farm Facilities in P/F No.4

STATUS OF DEMONSTRATION AND PILOT FARMS — AN AGRICULTURAL/AGRONOMY REPORT

1. Demonstration Farm

An important training facility at the centre is the demonstration farm. This farm covers an area of 4.6 ha. and comprises 9 standard farm-lots of 0.3 ha. each (75m x 40m) and 3 other farm-lots having different dimensions. It is self-supporting with the provision of a storage pond, irrigation and drainage systems and farm roads. The water required for its cultivation is either obtained from the irrigation pond, ground water or available rainfall.

1.1 Utilization of the Demonstration Farm

The demonstration farm is used by the trainees for field works that are involved in rice cultivation. In addition, it also serves as a test plot to conduct experiments or field studies on various subjects related to water management for rice cultivation. The research programs are carried out in collaboration with MARDI (Malaysian Agricultural Research and Development Institute). Research subjects currently undertaken in collaboration are as follows:

a) The effects of organic matter on rice crop under good water management condition.
b) The effects of fertilizer (urea) placement on rice crop performance under good water management condition.
c) Adaptive trials on different varieties of padi under good water management condition.

The demonstration farm also provides demonstration on various cultivation techniques pertaining to rice cropping practices such as direct seeding, mechanised, manual as well as broadcast transplanting. The demonstration includes perpetual (monthly) planting of rice such that whoever attended the courses offered by the center will be able to observe the various stages of crop growth at the same time.

1.2 Management of the Demonstration Farm

The cultivation works in the demonstration farm is managed by the Agronomy Section comprising an Agronomist, Assistant Agriculture Officer, Agriculture Technician, Junior Technician and 2 Tractor Operators and 5 labourers. Supportive services in terms of laboratory analysis for crop cutting surveys and soil analysis are carried out by the Laboratory Assistant.

1.3 Cropping intensity

The rice crop is cultivated twice per year (200% cropping intensity) on the standard lots simulating the popular practice in most irrigation schemes in Malaysia while for demonstration purposes some lots are being planted on a perpetual basis having at least a planting of one crop per month. The total acreage planted is 3.86ha per season. At present, a special project on planting of 5 crops in two years is also carried out. The average yield on standard lots regardless on the techniques of crop establishment has been very encouraging and considered very high.

Average crop yield (kg/ha) and various varieties of padi planted at Demonstration Farm, NWMTC.

Season	Varieties	Average Yield	Highest Yield
Main Season 1985/86	MR 27,52,71, 73,77,	5244	6407
Off-Season 1986*	MR 47,73, 77,84	4493	4997
Main Season 1986/87	MR 71,73,77, 84,85	5725	7600
Off-Season 1987	MR 71,73,77, 81,84,Pak Said	6899	8250
Main Season 1987/88	MR 73,81,84, E34,Y1018	5418	6120

* — Low yield due to occurence of drought.

2. Pilot Farms

Besides the above facilities in the center, four pilot farms are also made available to the centre as its training facilities. These four pilot farms, which are located in the KADA Area, are as follows:-

i) Pilot Farm No.1 at Tunjong (18 ha.)

ii) Pilot Farm No.2 at Kadok (13 ha.)

iii) Pilot Farm No.3 at Kg. Seberang Lating (10 ha.)

iv) Pilot Farm No.4 at Padang Lindong (18 ha.)

Each pilot farm represents a model of a particular concept of water management and has been constructed with on-farm facilities such as irrigation and drainage system as well as a network of farm roads. The basic objective of the pilot farms is to provide practical examples to farmers and trainees on improved water management and rice cultivation practices for increased productivity.

2.1 Operation of Pilot Farms

Besides the training facilities available in the center at Kampong Panji, the centre is also involved in the operation and management of four pilot farms in the KADA Area as mentioned above. The basic objective of these pilot farms is to provide terminal irrigation, drainage and road facilities to existing padi growing areas in order to practice proper water management and improved rice cultivation methods for increased productivity. At the same time, the pilot farms also serve to provide field training facilities for the course participants of the centre.

2.2 Management of Pilot Farms

Cultivation activities in the pilot farms are carried out by the farmers under the close guidance and supervision of the Pilot Farms Working Committee comprising representatives from KADA and the National Water Management Training Centre. The composition of the Pilot Farms Working Committee is given in below:

Members of Pilot Farms Working Committee

1.	Agronomist, KADA	-	Chairman
2.	Agronomist, NWMTC	-	Co-Chairman
3.	Senior Engineer, NWMTC	-	Secretary
4.	Engineer, NWMTC		
5.	Sociologist, KADA		
6.	Agriculture Engineer, KADA		
7.	Chief Irrigation Inspector, KADA		
8.	Managers of the FAs, KADA		
9.	Senior Technical Assistant, NWMTC		
10.	Senior Agriculture Assistant, NWMTC		
11.	Senior Irrigation Inspector, NWMTC		
12.	Block Leaders of Pilot Farms		

The Working Committe is responsible to the field works in the pilot farms. This committee meets regularly to discuss the field operations and problems and to hold dialogue sessions with the farmers concerned. It is responsible to look into cultivation problems encountered by the farmers as well as field organisation of farmers' groups. The committee also prepares the planting schedule for the pilot farms during each planting season.

2.3 Farmers' Participation

The farmers from the four pilot farms had attended training courses at the centre where they were informed and demonstrated on the effective water management practices for rice cultivation. As for the cultivation, the proposed planting schedule prepared by the Working Committee was put forward for discussion and acceptance by the farmers. For effective field operation and good cooperation, the farmers have been grouped according to field block of each pilot farm, and the leaders have been selected for each field block by the farmers from the respective block. The leaders are responsible to the Working Committee to organise the farmers and to ensure that the planting schedule is closely followed. Arrangements for other field activities such as nursery bed selection and "gotong royong" works are also taken care by the block leaders.

2.4 Pilot Farms Cultivation

Basing on the water supply schedule of KADA for a planting season, the Working Committee prepares the planting schedule for each pilot farm. Following that, a meeting with the farmers is held in order to discuss on the detailed activities and to confirm the schedule. During the planting season, officers from KADA and the centre visit each pilot farm regularly to assist and ensure that the program is followed. Besides giving guidance and supervision to the farmers, the centre also carry out cultivation works in demonstration plots as well as field studies on water management in the pilot farms.

Table showing the average yields (kg/ha) obtained from the previous seasons (Off Season 1986–Off Season 1987) in the Pilot Farms.

Season	PF No.1	PF No.2	PF No.3	PF No.4
Off-Season 1986	4941	5437	4666	-
Main Season 1986/87	4178	4804	4108	4010
Off-Season 1987	4697	3961	3666	5067

Since the pilot farms were put into operation, the response from the respective farmers has been good, and the Farmers' Associations concerned have also been very cooperative. With the provision of terminal facilities, the on-farm water management and padi cultivation in the four pilot farms have very much improved and the yields obtained were encouraging.

LIST OF FARM MACHINERIES AND AGRICULTURAL EQUIPMENT DONATED BY JICA UNDER THE FIRST TECHNICAL COOPERATION PROJECT

No.	Machine/Implement	Qty.	Year
1.0	4-Wheel Tractor'	1	1978
1.1	4-Wheel Tractor'	1	1978
1.2	4-Wheel Tractor'	1	1979
1.3	4-Wheel Tractor'	1	1979
1.4	4-Wheel Tractor	1	1980
1.5	4-Wheel Tractor	1	1980
2.0	4 WD Tractor	1	1982
3.0	Combine Harvester	1	1978
4.0	Combine Harvester	1	1978
4.1	Combine Harvester	1	1979
4.2	Self-driven thresher	1	1980
4.3	Combine Harvester	1	1984
5.0	Threncher	1	1979
6.0	Rice Transplanter	1	1978
7.0	Rice Transplanter*	1	1978
7.1	Rice Transplanter*	1	1978
7.2	Rice Transplanter	1	1978
7.3	Rice Transplanter	1	1982
7.4	Rice Transplanter	1	1984
7.5	Rice Transplanter	1	1984
8.0	Trailer	1	1979
8.1	Trailer	1	1979
9.0	Power Tiller	1	1979
9.1	Power Tiller	1	1979
9.2	Power Tiller	1	1979
9.3	Power Tiller	1	1979
9.4	Power Tiller	1	1979
10.0	Farm Porter	1	1979
11.0	Vibratory Plate Compactor	1	1982
12.0	Silent Power Rammer	1	1982
13.0	Vibratory Roller	1	1982
14.0	Slasher (Service Cutter)	1	1983
15.0	Knapsack Grass Cutter*	1	1982
15.1	Knapsack Grass Cutter*	1	(1980)
15.2	Knapsack Grass Cutter*	1	(1980)
15.3	Knapsack Grass Cutter*	1	(1980)
15.4	Knapsack Grass Cutter	1	1983
15.5	Knapsack Grass Cutter	1	1983
16.0	Lawn Mower	1	1982
16.1	Lawn Mower	1	1982
17.0	Automatic Driven Mowing Machine	1	1979
18.0	Self-priming Pump	1	1979
18.1	Self-priming Pump	1	1979
19.0	Water Pump	1	1982
19.1	Water Pump	1	1982
19.2	Water Pump	1	1982
19.3	Water Pump	1	1982
20.0	Self-priming Volume Pump	1	1980
21.0	Submersible Motor Pump*	1	1978
21.1	Submersible Motor Pump*	1	1978
21.2	Submersible Motor Pump*	1	1978
24.0	Chain Saw	1	1983
25.0	Ventilation Storage Tank	1	1979

No.	Machine/Implement	Qty	Year
25.1	Ventilation Storage Tank	1	1979
26.0	Recirculating Suction Type Dryer	1	1979
27.0	Bicycle	1	1979
27.1	Bicycle	1	1979
27.2	Bicycle	1	1979
27.3	Bicycle	1	1979
27.4	Bicycle	1	1979
28.0	Glass Fibre Motor Boat	1	1979
29.0	Forklift	1	1982
30.0	3-Phase Generator (Portable)	1	1979
30.1	3-Phase Generator	1	1978
31.0	Mist Blower*	1	1979
31.1	Mist Blower*	1	1979
31.2	Mist Blower	1	1979
31.3	Mist Blower	1	1979
31.4	Mist Blower	1	1979
32.0	Hand Granule Spreader	1	1980
32.1	Hand Granule Spreader	1	1980
33.0	Hand Duster	1	1980
33.1	Hand Duster	1	1980
33.2	Hand Duster	1	1980
33.3	Hand Duster	1	1980
33.4	Hand Duster	1	1980
33.5	Hand Duster	1	1980
34.0	Power Knapsack Mist Duster	1	1980
34.1	Power Knapsack Mist Duster	1	1980
35.0	Vibratory Sub-soiler	1	1979
35.1	Vibratory Sub-soiler	1	1979
36.0	Power Sprayer	1	1982
36.1	Power Sprayer	1	1982
36.2	Power Sprayer	1	1982
37.0	Hand-worked scattering apparatus	1	1979
37.1	Hand-worked scattering apparatus	1	1979
37.2	Hand-worked scattering apparatus	1	1979
37.3	Hand-worked scattering apparatus	1	1979
37.4	Hand-worked scattering apparatus	1	1979
38.0	Testing Winnower	1	1979
39.0	Testing Winnower	1	1980
40.0	Power Monocycle	1	1979
41.0	Hand Rotary Weeder	1	1980
41.1	Hand Rotary Weeder	1	1980
42.0	Electromotive Testing Winnower	1	1980
43.0	Hand Grain Winnower	1	1980
43.1	Hand Grain Winnower	1	1980
44.0	Foot Operated Thresher	1	1980
45.0	Levee Maker	1	1984
46.0	Ridger	1	1984
47.0	Drive Harrow (Rotor Puddler)	1	1982
48.0	Drive Harrow (Rotor Puddler)	1	1980
48.1	Drive Harrow (Rotor Puddler)	1	1980
48.2	Drive Harrow (Rotor Puddler)	1	1980
48.3	Drive Harrow (Rotor Puddler)	1	1980
49.0	Drive Harrow (Rotor Puddler)	1	1980
49.1	Drive Harrow (Rotor Puddler)	1	1980
50.0	Drive Harrow (Rotor Puddler)	1	1979
50.1	Drive Harrow (Rotor Puddler)	1	1979
51.0	Rotavator	1	1979

No.	Machine/Implement	Qty	Year
51.1	Rotavator	1	1979
51.2	Rotavator	1	1980
51.3	Rotavator	1	1980
51.4	Rotavator	1	1979
51.5	Rotavator	1	1979
52.0	Rear Grader	1	1980
52.1	Rear Grader	1	1980
53.0	Disc Harrow	1	1984
53.1	Steel Plow	1	1984
54.0	Docking Loader	1	1982
55.0	Rotary Cutter	1	1984
56.0	Self-driven flail mower	1	1984
57.0	Brush cutter	1	1984
57.1	Brush cutter	1	1984
58.0	Power thresher	1	1984
59.0	Fertilizer mixer	1	1984
60.0	Levee coating machine	1	1984
60.1	Levee coating machine	1	1984
61.0	Low trailer	1	1984
62.0	Seeder	1	1984
63.0	Coating machine	1	1984
64.0	Power Sprayer	1	1984
64.1	Power Sprayer	1	1984
65.0	Transplanter, riding type	1	1984
66.0	Soil sieving machine	1	1984
67.0	Self-driven thresher	1	1984
68.0	Rice Transplanter	1	1984
68.1	Rice Transplanter	1	1984
69.0	Soil mixer	1	1984
71.0	Trailer	1	1982
72.0	Trailer	1	1982
72.1	Trailer	1	1982
72.2	Trailer	1	1982
73.0	Slice plow	1	1984
74.0	Seeder	1	1982
75.0	Aluminum bridge	4	1979
75.1	Aluminum bridge	2	1979
76.0	Electromotive thresher	1	1979
77.0	Cage wheel	1	1985
78.0	Cage wheel	1	1985
79.0	Cold water high pressure pump	1	1985
80.0	Soil Siever	1	1985
81.0	Seeding machine	2	1985
82.0	Soil machine	2	1985
83.0	Soil covering machine	2	1985
84.0	Grain elevator	1	1986
85.0	Seedling Tray	600	1982
85.1	Seedling Tray	200	1982
85.2	Seedling Tray (BT-slotted)	400	1982
86.0	Seeding bag (10kg cap.)	20	1984

(*) These items are already condemned.
Other items' useful life can be indicated from the year the equipment/machinery is received.

(') These machines are being placed at KADA Farm Machinery Center which services the four Pilot Farms attached to the NWMTC.

LIST OF PARTICIPANTS WHO ATTENDED COUNTERPART TRAINING IN JAPAN

No	Name	Department	Training Course	Duration	Position	Place
1.	A. Kulasingam	D.I.D.	Study Tour on Water Management	2 wks (Mar., 78)	Retired	-
2.	Tg. Mohamad Raja Daud	D.I.D.	Agricultural Land and Water Resources Development	2 mths (Jun-Aug., 78)	Senior Engineer	USM Hospital
3.	A. Lyander	D.I.D.	Study Tour on Water Management	2 wks (Sep., 78)	Senior Engineer	Western Johore Project
4.	Khoo Soo Hock	D.I.D.	Study Tour on Water Management	2 wks (Sep., 78)	Retired	-
5.	Wan Alias Daud	K.A.D.A	Agricultural Land and Water Resources Development	2 mths (Jun-Jul., 79)	Senior I.I.	KADA
6.	Lim Thye Lian	D.I.D	Study Tour on Water Management	2 wks (Nov., 79)	Retired	-
7.	Nik Yusoff Ismail	K.A.D.A.	Study Tour on Water Management	2 wks (Nov., 79)	Director	Agriculture Div. KADA
8.	Chan Choong Cheong	D.I.D. - N.W.M.T.C.	Study Tour on Water Management	2 wks (Sep., 80)	Dep State Director	DID Johore
9.	Nik Ariff Sulaiman	D.I.D. - N.W.M.T.C.	Study Tour on Sub-Soil Drainage	3 wks (Nov/Dec., 80)	Agronomist	NWMTC
10.	Mansor Adabi Ahmad	D.I.D. - N.W.M.T.C.	Irrigation and Drainage	8 mths (Mar-Nov., 81)	Senior T.A.	NWMTC
11.	Abdul Malek Dollah	D.I.D.	Irrigation and Drainage	1 mth (Feb/Mar., 82)	Senior Time Engineer	DID-HQ

12.	Chan Choong Cheong	D.I.D.- N.W.M.T.C.	Irrigation and Drainage	1 mth (Oct/Nov, 82)	Dep. State Director	DID Johore
13.	Hassan Awang	D.I.D.	Irrigation and Drainage	1 mth (Oct/Nov, 82)	Senior Time Engineer	DID Kelantan
14.	Hidayah Hj. Abdullah	D.I.D.- N.W.M.T.C.	Irrigation and Drainage	5 wks (Sep-Oct, 83)	Senior Time Engineer	NWMTC
15.	Ariffin Mahamud	D.I.D.	Irrigation and Drainage	10 mths (Feb-Nov, 84)	Senior T.A.	Krian/Sg.Manik Project
16.	Khor Kheng Wee	D.I.D.-N.W.M.T.C.	Rice Cultivation	1 mth (Oct, 84)	Senior T.A.	NWMTC
17.	Hj. Kob Hj. Abu Bakar	K.A.D.A.	Rice Cultivation	6 mths (Apr-Sep, 85)	Senior T.A.	KADA
18.	Wan Sulaiman Ismail	D.I.D.-N.W.M.T.C.	Study Tour on Water Management	2 wks (Nov, 85)	Engineer	NWMTC

DEVELOPMENT OF APPROPRIATE IRRIGATION SYSTEMS FOR NON-PADDY CROPS (UPLAND IRRIGATION) FOR GENERAL APPLICATION IN THE NON-GRANARY IRRIGATED PADDY AREAS

APPLICATION FOR EXPERTS

1. BACKGROUND

In early 1984, the Government of Malaysia formulated the National Agricultural Policy which provides that paddy production will be concentrated in eight existing large irrigation schemes (granary areas), while in new areas and in the existing marginal paddy schemes, priority will be given towards the development of crops for food consumption and import substitution.

To meet the National Agricultural Policy's stated strategy on future crop development, appropriate knowledge and technology on the irrigation of upland (non-paddy) crops need to be developed and subsequently disseminated to all levels of government personnel and farmers. An important area in which knowledge is to be acquired is in the field of efficient management of water commencing from the source, through the delivery system and down to the on-farm level. The Department of Irrigation and Drainage proposes to carry out a project to develop the most appropriate systems for upland irrigation for general application in the country, particularly in the non-granary irrigated paddy areas.

The non-granary irrigated paddy areas presently covers some 92,530 hectares, or 30 % of the 304,380 hectares of irrigated paddy land in the country. The irrigation and drainage facilities in these areas consists generally of run-of-river type intake, occassionally with pumping stations, and low provision of on-farm facilities.

These areas are faced with a number of constraints including uneconomic size holdings, inefficient traditional methods of production, restrictive conditons with regard to cropping patterns and inadequate access to assistance and support services. The interplay of these constraints have resulted in low level of productivity and high incidence of poverty among the farmers.

2. OBJECTIVE OF PROJECT

The objective of the project is to develop a number of appropriate irrigation systems for non-paddy crops (upland irrigation) for general application in the non-granary irrigated paddy areas.

3. SCOPE OF WORK

The work to be carried out in this project shall comprise but not necessarily be limited to the following :

- to collect, collate and review all local experiences in the field of upland irrigation
- to determine appropriate upland irrigation systems suitable for local condition
- to assist in identifying and developing pilot areas where such appropriate upland irrigation systems can be tested
- to assist in monitoring and evaluating appropriate upland irrigation systems
- to carry out any research as are necessary for the success of the project
- to recommend appropriate upland irrigation systems for use in the non-granary irrigated paddy areas

4. EXPERTISE REQUIRED

Four experts are requested to assist in the project of which two shall be required for long term periods of three years each and two shall be required for short term periods of six months each.

4.1 Long Term Experts

One (1) agriculture civil engineer with ten to fifteen years experience in upland irrigation systems, in particular sprinkler, furrow, trickle and drip systems. He shall be required to develop and recommend appropriate upland irrigation systems for use in Malaysia, taking into consideration local experience, local materials as well as the latest technology available in Japan. He shall prepare and carry out related research programmes as are necessary. He shall also develop the necessary monitoring and evaluation procedures for determining the suitability of appropriate irrigation systems.

One (1) agronomist with ten to fifteen years experience in upland crops. He shall work with the agriculture civil engineer to develop appropriate upland irrigation system for use with various recommended upland crops. He shall prepare and carry out related research programmes and provide the desired agricultural input for the project. He shall also assist in identifying and locating pilot areas for the study.

4.2 Short Term Experts

One (1) soil scientist with fifteen years experience in soil-water-plant characteristics. He shall carry out the necessary soil tests

and establish soil characteristics curves for use in planning and design of upland irrigation. He shall also assist in identifying and locating pilot areas for the study.

One (1) farm machinery expert with fifteen years experience in the use of farm machineries in upland irrigation. He shall assist the project team in determing the most appropriate types of farm machineries necessary for the cultivation and irrigation of upland crops.

5. DURATION OF PROJECT

The total duration of the project is expected to take five years. However, the experts are particularly required in the first three critial years of the project to review, identify and develop the appropriate irrigation systems. The later half of the project will consist of monitoring and evaluation of these systems and should the need arise then, further technical assistance will be sought under the technical cooperation programme with the Government of Japan.

6. REQUEST FOR TECHNICAL EQUIPMENT

The objective of the project is to develop a number of appropriate irrigation systems for non-paddy crops (upland irrigation) for general application in the non-granary irrigated paddy areas. Towards this objective, there will be a need to test out under actual field operating conditions various types of upland irrigation systems, ranging from rudimentary systems to the latest state-of-the-art equipment presently being used in advanced countries such as Japan. Assistance is sought from the Government of Japan to provide these and other related equipment under the technical cooperation programme.

7. GOVERNMENT RESPONSIBILITY

To facilitate the smooth conduct of the project, the Government of Malaysia will provide all the necessary assistance as are laid out in General Circular 1 of 1979. The Department of Irrigation and Drainage will act as the main counterpart agency for the project and will provide all necessary counterpart staffs as are required to complete the project.

Jabatan Parit dan Taliair,
Malaysia.
LTK/Mac 1988

Future Development of Demonstration Farms at NWMTC.

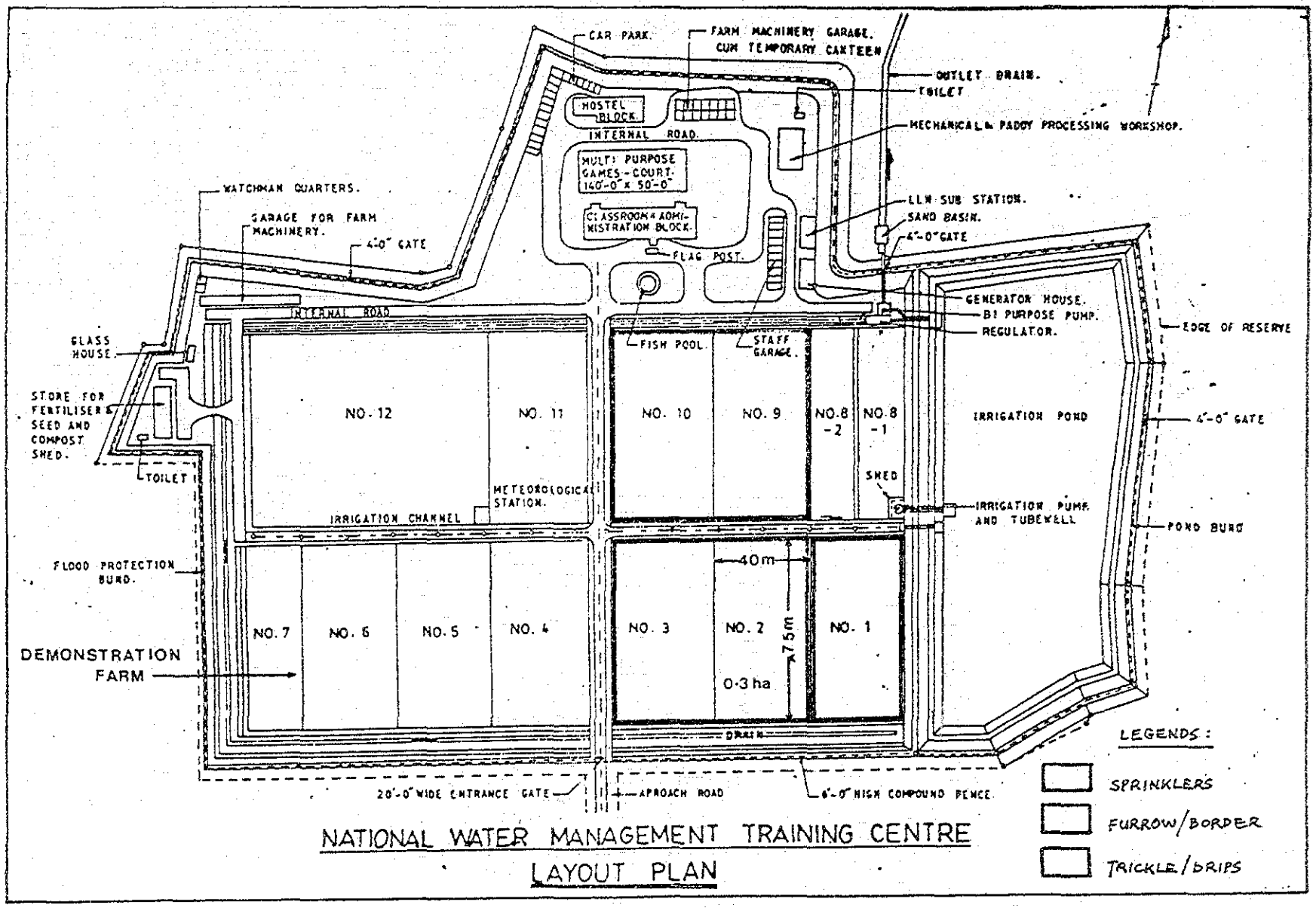
In line with the National Agricultural Policy on future crop development, Drainage and Irrigation Department (DID) will play an active role in crop diversification study and to develop the most appropriate systems for non-paddy irrigation. As far as NWMTC is concerned, various aspects on water management for non-paddy crops are very essential for the needs of future development in providing its new training modules. In view of this, proposed modifications of irrigation systems will be made to the existing demonstration farms, whereby their present status are mainly being utilised by paddy cultivation.

Various different types of irrigation systems with different approaches in their water management are proposed and to be adopted on the demonstration farms. The systems include Sprinklers, Trickle (Drips), Furrows and Borders. Sprinkle and Trickle irrigation together represent the broad class of irrigation methods in which water is carried through a pipe system to a point near to where the water will be consumed. As shown in the layout plan attached, Lot No. 1 with an area of 0.3 ha. would be provided with Drip irrigation system. This system is best suited to tree crops such as fruit trees. Lots No. 9 and 10 with total area of 0.6 ha. would be provided with Sprinklers system. Shallow rooted crops such as vegetables shall be planted under this system. Furrows and Borders irrigation methods are used to spread water as uniformly as possible in the soil to irrigate the crops. In Borders, the land is divided into strips by small earth ridges. It can be adapted to suit field and row crops. As for Furrows, land is divided into small channel and is suited to row crops such as sweet corn. Lots No. 2 and 3 with a total area of 0.6 ha. would be provided with these two types of irrigation systems.

The existing soil condition in all the demonstration farms comprised of very heavy clay soil which is suitable for paddy cultivation. The soil forms very hard lumps and blocky with large cracks when dry and is very plastic and sticky when wet. Such soil is unsuitable for the cultivation of non-paddy crops. Under the proposed modification, this soil will be replaced with moderately coarse textured soil such as sandy loam which is more suitable for the cultivation of non-paddy crops.

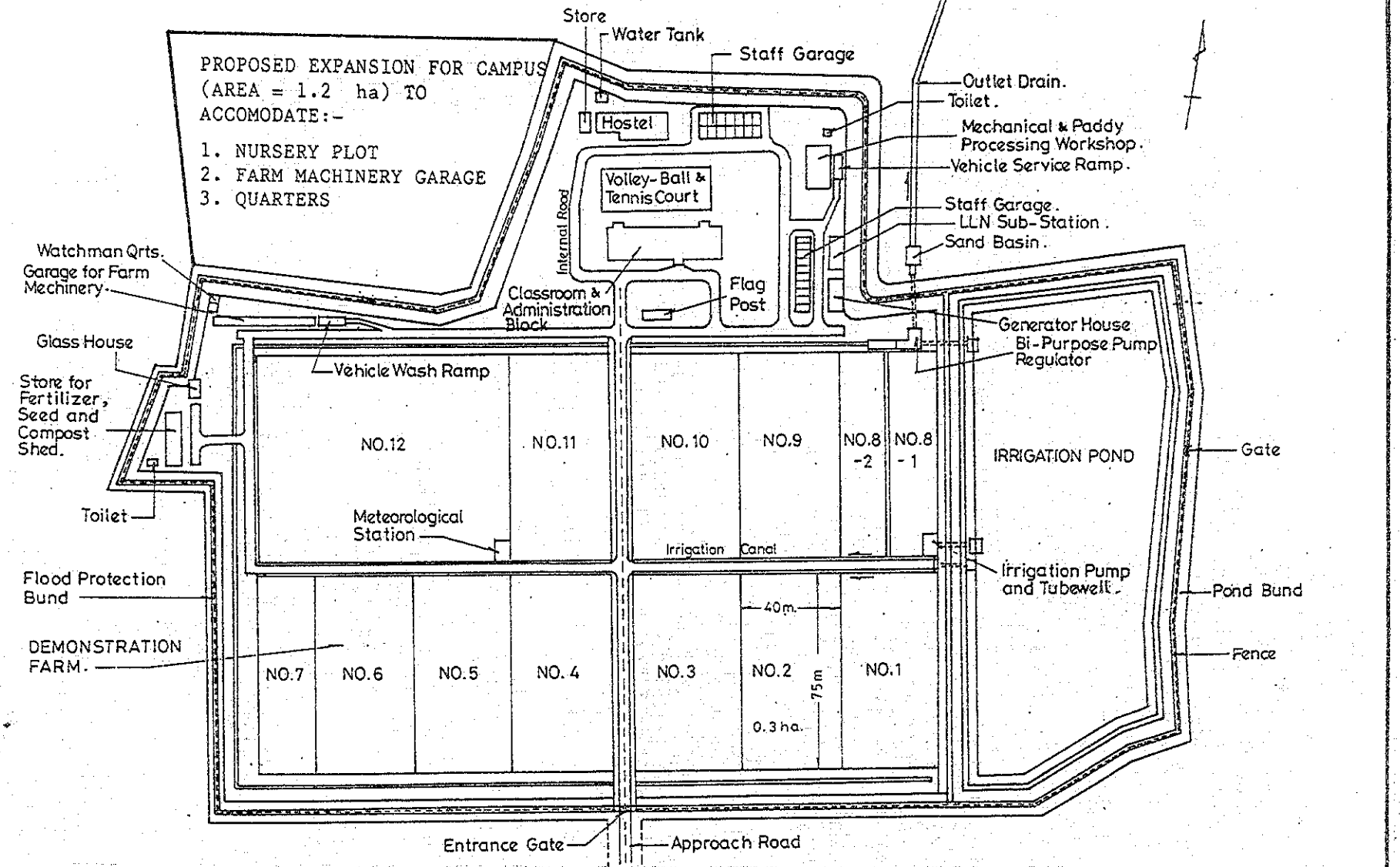
The future modification of the demonstration farm has only undergone the preliminary planning stage. Detailed design of the new systems has yet to be carried out.

In addition, Pilot Farms will also be identified in the nearby existing irrigation schemes. The present irrigation systems in the selected schemes would be changed accordingly for the purpose of crop diversification. A maximum of 2 farms will be selected and proposed for the Pilot Farms. However, the locations of the proposed Pilot Farms will be identified with the cooperation of the State Drainage and Irrigation Department of Kelantan.



NATIONAL WATER MANAGEMENT TRAINING CENTRE

LAYOUT PLAN



NATIONAL WATER MANAGEMENT TRAINING CENTRE
LAYOUT PLAN

List of Proposed Request for Machinery and Equipment
(Tentative)

NO.	Equipment/Machinery	Qty	Remarks
1	4-WD Tractor (40 HP)	1	
2	Ridger	2	
3	Disc Plow	1	
4	Molboard Plow	1	
5	Rotavator (L-blades)	2	for dryland use
6	Corn sheller	1	
7	Corn harvester	1	small HP unit
8	Fertilizer/grain seeder implement	1	or separate unit
9	Leaf analyzer	1	
10	Colorimeter set	1	
11	Gas Chromatography Equipment	1	
12	Beam balance	2	2 kg, 5 kg
13	Platform balance	2	150 kg
14	Pan-type electronic balance	2	
15	Digital pH meter	1	
16	Digital conductivity meter	1	
17	Magnetic solution shaker	1	
18	Soil moisture tester	2	portable type
19	Hand refractometer	1	
20	Grain micrometer	2	
21	Mechanical analysis stirrer	1	
22	Hydrometer jar	2	
23	Liquid limit test set	1	
24	Plastic limit test set	1	
25	Shrinkage limit test set	1	
26	Irrigation water tester, Kobayashi type	1	
27	Saline tester	1	
28	Tensiometer	6	
29	Soil permeability tester	1	
30	Sprinkler system component set	1	
31	Mist system component set	1	
32	Drip irrigation set	1	
33	Offset printer equipment	1	
34	Laser writer printer (Apple computer)	1	
35	Water Distiller	1	
36	Trickle system component set	1	
37	Pocket penetrometer	2	
38	Hand penetrometer	2	
39	Combined digital EC/pH meter	1	
40	Soil moisture tester (lab. apparatus)	1	
41	Grain moisture meter	2	
42	Portable overhead projector	1	
43	Grain moisture meter	2	
44	Paddy Direct seeding machine (pedestrian)	2	for puddled cond.
45	Rotavator type drive harrow	1	for paddy

Note: The above list is tentative and only preliminary in nature. The full list will be prepared after consultation with the JICA Experts attached to NWMTC between 1989–1990.

1

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE

Thirteenth Congress

Rabat, 1987

Q.41
R. 9

WATER MANAGEMENT TRAINING IN MALAYSIA

CHAN CHOONG CHEONG[1]

SUMMARY AND CONCLUSIONS

Rice is the staple food for the people of Malaysia, and it is mainly cultivated on about 500,000 ha of lowland as wet paddy. For paddy cultivation, water constitutes a basic pre-requisite and it is generally acknowledged that proper water management is fundamental for increased crop production as well as the efficient utilisation of water. In the face of increasing demands on available water resources by the various sectors, the latter is gaining more and more significance.

Water management not only covers the proper supply, distribution, control and timely application of irrigation water to meet cultivation and crop requirements, but also greatly contributes toward providing suitable farm conditions for various cultivation activities. These include weed control, fertiliser application, crop protection and farm mechanisation. In order to carry out good water management, suitable field conditions are required and terminal on-farm facilities for irrigation, drainage and transportation have to be constructed. Through the practice of proper water management, irrigation water can be utilised more efficiently and some of the existing problems in paddy cultivation would be overcome. In recognition of the importance of water management, a number of agricultural development programmes have been implemented in recent years by the Malaysian Government where the provision of terminal facilities for improved on-farm water management is a major component. Eventually, it is anticipated that all the existing major rice growing areas in the country would be provided with such terminal facilities.

In line with as well as in support for this recent agricultural development in Malaysia, it is also realised the important need for long-term studies and training in water management. For this purpose, the National Water

*Formation en matière de gestion d'eau en Malaysia

[1]Principal, National water Management Training Centre, Drainage and Irrigation Department, Ministry of Agriculture, P.O. Box 246, Kota Bheru, Kelantan, Malaysia.

Management Training Centre has been established in 1984. This Centre provides formal training in water management techniques to irrigation projects operation and management staff, both engineering and agricultural, ranging from technicians to professionals. Leader farmers from the irrigation projects are also invited to participate in the Centre's training programmes. Some basic criteria developed by the Centre for determining good water management practice in paddy fields are introduced. It is envisaged that through the water management training programmes, it would result in the following improvements and increased productivity of available resources:

(*a*) A general improvement in rice farming in Malaysia bringing about consequently increases in yield and production per unit area of paddy fields.

(*b*) An acquisition of the basic knowledge and understanding of proper water management practice by the farmers who would give due attention to co-operation on cultivation activities thereby enhancing water distribution and control in the paddy fields.

(*c*) An increased standard of service to the farmers as a result of project operation and management staff becoming more efficient and knowledgeable in good water management techniques.

(*d*) Significant improvement in the co-operation and understanding between government officers responsible for irrigation projects operation and farmers.

(*e*) Considerable water saving since water would be utilised more efficiently and economically through proper water management as well as minimising wastages and losses.

RESUME

Le riz est la principale culture de Malaysia. La culture du riz occupe une superficie de 500.00 ha des basses terres. Pour la culture du riz, l'eau constitute un élément de base. Il est généralement reconnu qu'une gestion d'eau convenable ainsi que l'utilisation efficace de l'eau, est un facteur important pour l'accroissement de production.

La gestion d'eau couvre non seulement la fourniture, la distribution, la maîtrise et l'apport d'eau à la parcelle en temps opportun, mais contribue aussi de beaucoup à créer des conditions favorables à la ferme pour de nombreuses activités culturales. Ces activités comportent la lutte contre les mauvaises herbes, l'application des engrais, la protection des cultures et la mécanisation des fermes. Pour réaliser une meilleure gestion, il est nécessaire de disposer des conditions favorables à la parcelle, et de mettre en place des infrastructures d'irrigation, de drainage, et de transport d'eau.

Compte tenu de l'importance de gestion d'eau, nombreux projets de développement agricole ont été mis en place par le gouvernement malaysien pendant ces dernières années. Il est espéré que toutes les régions productrices du riz dans le pays seront pouvues de ces facilités. Compte tenu de ce qui précède et du récent développement agricole, il est prévu d'introduire des

UTUSAN MALAYSIA

Watch on work of officers

KOTA BARU, Tues. — The Agriculture Ministry will monitor the performance of agriculture officers and other personnel who were sent for training overseas to ensure they fulfilled what was expected of them.

Agriculture Minister Encik Anwar Ibrahim said today the work performance of those who had undergone training would be observed by the Ministry.

He was speaking at the opening of the National Water Management Training Centre at Panji, near here, today.

Agriculture officers and technicians and drainage and irrigation technicians stationed in rural areas were also urged to be more committed and responsible in handling their jobs.

They must show initiative and be involved in total in the projects they are handling in order to influence and teach the farmers new techniques.

On training, the Minister said his Ministry is emphasising on 'farmers bias' type of training at its training centres.

Agriculture officer had been directed to hold meetings with farmers and liaise closely with them before a project was implemented.

The Minister said training was necessary for those involved directly or indirectly in the development of agriculture in view of innovations in technologies.

It could also help those who had been professionally trained to adjust to the local conditions.

Encik Anwar said Islamic traits like efficiency in work were being instilled in training programmes under his Ministry. This was partly of the Government efforts in assimilating Islam in its administration.

On the National Water Management Centre, Encik Anwar said this was one of the projects Malaysia gained from the Look East policy.

The centre, costing more than $15 million, is the first in the Asian region.

KPLPAK tingkatkan daya pengeluaran pertanian negara

KOTA BAHARU 24 Okt. – Kompleks Pusat Latihan Pengurusan Air Kebangsaan (KPLPAK) di Kampung Panji, di sini yang dirasmikan oleh Menteri Pertanian, Encik Anwar Ibrahim baru-baru ini membawa erti yang besar terhadap peningkatan daya pengeluaran pertanian terutama padi di negara ini.

Pusat yang menelan belanja $15 juta itu dilaksanakan dengan bantuan teknikal Kerajaan Jepun melalui Japan International Cooperation Agency (JICA) di bawah rancangan Colombo. Dari jumlah itu $9,1 juta bantuan dari Kerajaan Persekutuan dan $6.6 juta dari Jepun.

Kemudahan - kemudahan yang ada di pusat itu akan digunakan untuk memberi latihan kepada kakitangan Jabatan Parit dan Taliair dan lain - lain agensi berkenaan bagi mempertingkatkan lagi kecekapan dan keupayaan dalam bidang pengurusan air di projek - projek pengairan di negara ini.

Sehingga ini seramai 79 orang juruutera, 75 pembantu teknik, 58 merinyu taliair, 59 pengawas pengairan dan 248 petani padi telah diberikan latihan di pusat itu.

Objektif - objektif Pusat Latihan Pengurusan Air Kebangsaan itu adalah seperti berikut:-

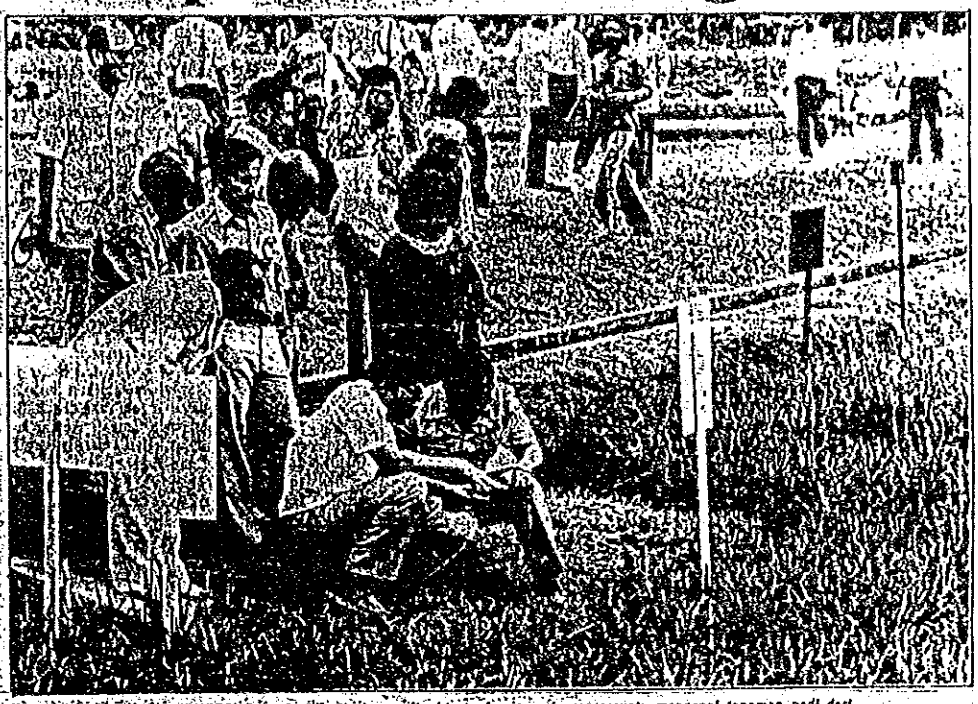
- Untuk memberi latihan dalam perkhidmatan kepada pegawai - pegawai yang terlibat dalam perancangan dan operasi projek - projek pengairan mengenai teknik - teknik pengurusan air bagi tanaman padi.
- Untuk memberi latihan kepada para petani mengenai teknik - teknik pengurusan air supaya memperbaiki penanaman dan meningkatkan pengeluaran padi.
- Untuk membantu pemindahan teknologi - teknologi baru yang bersangkutan dengan penanaman padi kepada petani - petani melalui program latihan pengurusan air.
- Untuk menubuhkan persefahaman yang lebih baik di antara petani - petani dan pegawai - pegawai kejuruteraan dan pertanian dalam operasi projek - projek pengairan melalui kursus - kursus latihan pengurusan air.

Pusat Latihan Pengurusan Air itu merupakan yang tunggal di negara ini mempunyai empat tingkat mengandungi satu blok perpustakaan, bilik kuliah yang dilengkapi dengan perpustakaan, makmal dan kemudahan-kemudahan lain.

Ia juga mengandungi sebuah asrama tiga tingkat bagi 42 orang pelatih, sebuah bangunan bengkel mekanikal memproses padi, bangunan - bangunan utiliti seperti stor kimia pertanian, garaj - garaj, rumah generator, ladang demonstrasi seluas 4.6 hektar dan berbagai jentera pertanian untuk padi berjentera.

Selain daripada kemudahan - kemudahan dalam kampus tersebut, pusat itu juga terlibat dalam operasi dan pengurusan empat buah ladang perintis melibatkan kawasan seluas 59 hektar.

Ladang - ladang perintis itu termasuklah di Tunjung 18 hektar, Kuduk 13 hektar, Kampung Seberang Latleg 10 hektar dan ladang perintis di Padang Lindung 18 hektar.



MENTERI Pertanian Encik Anwar Ibrahim sedang mendengar sesuatu mengenai tanaman padi dari seorang pegawai pertanian ketika melawat kawasan Kompleks Pusat Latihan Pengurusan Air Kebangsaan di Kampung Panji, Kota Baharu, Kelantan baru - baru ini.

Saintifik

Program - program latihan yang dijalankan oleh pusat ini adalah berhubung rapat dengan keperluan negara meliputi kajian secara saintifik mengenai pengurusan air bagi tanaman padi dan juga merupakan latihan kepada pegawai - pegawai teknikal mengenai pengurusan air yang berkesan.

Pelatih - pelatih pusat itu terdiri dari juruteta, pembantu teknik, merinyu taliair, pegawai pengairan dan juruteknik dari Jabatan Parit dan Taliair Malaysia dan juga pegawai - pegawai teknik dari lain - lain agensi kerajaan yang terlibat dengan tanaman padi.

Latihan juga dikendalikan untuk petani - petani yang merupakan ketua - ketua dari kawasan pertanian masing - masing dan latihan juga boleh dikendalikan untuk peserta - peserta dari negara - negara lain.

Subjek - subjek utama yang diajar dalam berbagai program kursus termasuklah mengenai pengairan dan saliran, pengurusan air, penanaman padi secara moden, mekanisasi ladang, pemeliharaan tanaman, pengetahuan pertanian dan pembajaan.

Program - program latihan pula terdiri dari syarahan, demontrasi ladang, kerja amali serta lawatan - lawatan ke projek - projek pengairan yang berhampiran.

Selain dari itu pusat ini juga bertanggungjawab untuk mengendalikan peperiksaan jabatan bagi merinyu taliair dari Jabatan Parit dan Taliair Malaysia.

Encik Anwar ketika berucap mengharapkan dengan wujudnya pusat latihan tersebut dapat meningkatkan lagi daya pengeluaran pertanian terutama padi di negara ini.

Katanya, tidak ada makna penubuhan pusat berkenaan sekiranya hasil petani masih tidak berubah dan pengeluaran pertanian negara tidak bertambah.

"Inilah yang perlu diambil berat oleh semua pihak yang terlibat supaya dengan wujudnya pusat latihan ini benar - benar dapat memberi manfaat pada para petani dalam penanaman padi," jelasnya.

Sehubungan dengan itu beliau lalu menyeru semua pihak yang terlibat supaya dapat menjalankan tugas masing-masing dengan penuh kesedaran untuk membela nasib kaum petani.

Menteri Besar Kelantan, Datuk Haji Mohamad Yaacob pula ketika berucap sebelumnya menyatakan, kerajaan negeri sangat menghargai pembinaan pusat latihan yang ulung terdapat di negara ini yang diharapkan dapat meningkatkan hasil pertanian terutama padi di negeri itu.

Katanya, penubuhan pusat latihan itu amat sesuai memandangkan Negeri Kelantan adalah sebuah negeri pertanian yang sebahagian besar daripada penduduknya terdiri dari petani.

Menurutnya, sektor pertanian memberi sumbangan kepada keluaran dalam negeri kasar sebanyak 38.9 peratus dan dengan ini pertanian merupakan punca guna tenaga yang terbesar di Negeri Kelantan, di mana 70 peratus daripada guna tenaga yang aktif adalah terletak dalam bidang pertanian.

Beliau memberitahu, mengikut banci tahun 1981 jumlah petani bagi Negeri Kelantan ialah seramai 133,140 keluarga yang terlibat dalam berbagai jenis tanaman terutama sekali padi.

Oleh itu kerajaan negeri dan Kerajaan Pusat telah memberi keutamaan terhadap bidang pertanian dengan tujuan untuk mengurangkan kadar kemiskinan dan mengagihkan tabiat penduduk melalui pembangunan 'in-situ' atau program pembangunan setempat, katanya.

Beliau menyatakan, daripada 1,502,647 hektar luas Negeri Kelantan, 73,364 hektar (4.9%) adalah tanah padi yang merupakan tanaman kedua pentinganya sekpas getah yang mempunyai keluasan 118,156 hektar.

Menurutnya, hasil pengeluaran purata satu hektar padi telah meningkat iaitu sebanyak 3.7 tan satu hektar luar musim 1982 berbanding dengan 2.8 tan satu hektar dalam tahun 1981. Kelantan memberi sumbangan sebanyak 8 - 11% kepada pengeluaran beras negara.

Datuk Haji Mohamad menyeru para belia di negeri ini supaya berminat dalam bidang pertanian bagi menggantikan keluarga mereka yang telah tua yang tiada daya lagi mengerjakan tanaman padi.

Beliau percaya melalui pusat latihan tersebut akan dapat melahirkan ramai kalangan belia di negeri ini berminat dalam bidang pertanian moden, terutama dalam penanaman padi.

Water centre to go M'sian

THE National Water Management Training Centre in Kota Bharu, Kelantan, is expected to be fully managed and operated by Malaysians by March 1986, thus ending nine years of technical assistance from Japan.

Built as part of a water management project jointly undertaken by the Malaysian and Japanese Governments since September 1977, the centre will be officially opened next month.

The project was in response to the Third Malaysia Plan objective of increased food production, especially by expansion of padi fields that could be harvested twice yearly.

The latest issue of the *Japan News Letter* states that 79 engineers, 75 technical assistants, 58 irrigation inspectors and 59 irrigation overseers have been trained by the centre since 1981.

A number of one-day training programmes have been provided for 248 farmers, while eight trainees from the Republic of Mali attended a special course in May this year.

"The courses put emphasis on the relationship between water management and padi cultivation techniques in the field. This has been developed to suit local conditions."

The report explains that existing irrigation schemes are generally provided with facilities at an "off-take" (an intake of water) to padi fields, with each point commanding an average of 20 hectares of land.

"From the off-take, water is now being distributed plot by plot which results in general inefficiency and delay.

"The provision of on-farm facilities and water management techniques is playing a vital role in increasing the production of padi in Malaysia."

At the centre's Pilot Farm No. 1, for example, padi cultivation is now in its third season with the use of improved water management techniques.

As a result of studies and improved cultivation measures, the average yield of the main season in 1982/83 was as high as 4.6 tons per hectare compared with an average of 3.2 tons per hectare in the Asia and Pacific region.

Mechanised cultivation

Other activities at the pilot farm include guidance to farmers on selection of varieties, rotational irrigation during the pre-saturation period, establishment of a communal nursery and the application of fertilisers.

Improved cultivation techniques have also been gradually disseminated to neighbouring farms.

When the fourth (and last) pilot farm is completed next year, the centre is likely to expand its training activities to include more personnel from related Government agencies.

In addition, trainees and farmers have benefited from the centre's Demonstration Farm where mechanised cultivation techniques and soil fertility development are practised.

To date, the Japanese Government has spent about $6.52 million on the water management project while its Malaysian counterpart has contributed $7 million to build the centre and pilot farms and to finance operations.

PUSAT LATIHAN PENGURUSAN AIR KEBANGSAAN KOTA BHARU, KELANTAN

Jabatan Parit dan Taliair

PENGENALAN

Air merupakan satu bahan keperluan asas bagi tanaman padi dan pengurusan air secara berkesan adalah dianggap sebagai satu asas untuk meningkatkan daya pengeluaran padi serta penggunaan air yang lebih sempurna. Dengan bertambahnya permintaan terhadap sumber air negara, penggunaan sumber ini dengan cara yang lebih berkesan menjadi lebih penting.

Mengenali hakikat ini, kerajaan telah memberi penekanan yang sepenuhnya terhadap pengurusan air yang cekap di dalam usaha-usahanya untuk membangunkan kawasan pertanian terutama bagi kawasan padi. Satu daripada langkah-langkah yang telah diambil ialah dengan mempertingkatkan kemudahan-kemudahan di peringkat tersier supaya pengagehan air pengairan dapat dijalankan dengan sempurna. Adalah dijangka, kebanyakan kawasan pengairan di negara ini akan diperlengkapkan dengan kemudahan-kemudahan di peringkat tersier ini.

Walau bagaimanapun peningkatan kemudahan ini adalah tidak memberi makna jika usaha-usaha tidak diambil untuk menggunakan kemudahan-kemudahan ini dengan cara yang berkesan.

Justeru itu, kerajaan telah mengambil langkah untuk menubuhkan Pusat Latihan Pengurusan Air Kebangsaan di Kota Bharu, Kelantan sebagai sokongan ke atas kegiatan kerajaan bagi pembangunan pengairan di peringkat ladang.

Pusat Latihan Pengurusan Air Kebangsaan ini telah ditubuhkan di bawah salah satu program Jabatan Parit dan Taliair dengan bantuan teknikal dari Kerajaan Jepun melalui "Japan International Cooperation Agency (JICA)" di bawah Rancangan Colombo.

Upacara Perasmian Pusat Latihan ini telah diadakan pada 16hb. Oktober, 1984 oleh YB. Menteri Pertanian Malaysia, Saudara Anwar Ibrahim.

Petani-petani sedang mendengar penerangan tentang sistem pengairan di Ladang Demonstrasi.

2. OBJEKTIF-OBJEKTIF PUSAT LATIHAN

Objektif-objektif Pusat Latihan Pengurusan Air Kebangsaan adalah seperti berikut:-

a). Untuk memberi latihan dalam perkhidmatan kepada pegawai-pegawai yang terlibat dalam perancangan dan operasi projek-projek pengairan mengenai teknik-teknik pengurusan air bagi tanaman padi.

b). Untuk memberi latihan kepada petani-petani mengenai teknik-teknik pengurusan air supaya memperbaiki penanaman dan meningkatkan pengeluaran padi.

c). Untuk membantu dalam pemindahan teknologi baru yang bersangkutan dengan penanaman padi kepada petani-petani melalui program latihan pengurusan air.

d). Untuk mengadakan persefahaman dan kerjasama yang lebih baik di antara petani-petani dan pegawai-pegawai kejuruteraan dan pertanian dalam operasi projek-projek pengairan melalui kursus-kursus latihan pengurusan air.

Pensyarah memberi penerangan tentang berbagai jentera pertanian yang digunakan bagi penanaman padi.

3. KEMUDAHAN-KEMUDAHAN

Pusat Latihan Pengurusan Air Kebangsaan terletak lebih kurang 6 km. ke arah timur Kota Bharu, Kelantan di dalam kampus seluas 12 hektar. Kemudahan-kemudahannya termasuk satu blok pentadbiran/bilik kuliah 4 tingkat yang dilengkapi dengan perpustakaan, makmal dan kemudahan latihan lain, sebuah asrama 3 tingkat bagi 42 orang pelatih, sebuah bangunan bengkel mekanikal serta pemeroses padi, bangunan-bangunan utiliti seperti stor kimia pertanian, garaj-garaj, rumah generator, ladang demonstrasi seluas 4.6 hektar dan berbagai jentera pertanian untuk tanaman padi berjentera.

Selain daripada kemudahan-kemudahan dalam kampus tersebut di atas, pusat ini juga terlibat dalam operasi dan pengurusan 4 buah ladang printis seperti berikut:-

a). Ladang Perintis No. 1 di Tunjong — 18 ha.

b). Ladang Perintis No. 2 di Kadok — 13 ha.

c). Ladang Perintis No. 3 di Kg. Seberang Lating — 10 ha.

d). Ladang Perintis No.4 di Padang Lindong — 18 ha.

4. PROGRAM LATIHAN

Program latihan yang dijalankan oleh pusat ini adalah berhubung rapat dengan keperluan negara Malaysia; ianya meliputi kajian secara saintifik mengenai pengurusan air bagi tanaman padi dan juga merupakan latihan kepada pegawai-pegawai teknikal serta petani-petani mengenai pengurusan air yang berkesan.

Dua program latihan dijalankan di Pusat Latihan ini. Pertama, program latihan dalam perkhidmatan bagi pegawai-pegawai teknikal seperti Jurutera, Pembantu Teknik, Merinyu Taliair, Pengawas Pengairan dan Juruteknik dari Jabatan Parit dan Taliair dan juga pegawai-pegawai dari agensi-agensi lain yang terlibat di dalam pembangunan kawasan pertanian bagi tanaman padi. Program latihan yang kedua ialah latihan yang dikendalikan untuk petani-petani yang merupakan ketua-ketua kumpulan tani dari kawasan masing-masing.

Subjek-subjek utama yang diliputi dalam berbagai kursus adalah seperti berikut:-

a). Pengairan dan saliran.

b). Pengurusan air

c). Penanaman padi, termasuk subjek-subjek berkenaan dengan:-

i). Mekanisasi Ladang.

ii). Pemeliharaan Tanaman.

iii). Pengembangan Pertanian.

iv). Pembaiaan.

Y.B. Menteri Pertanian sedang mencuba mesin menanam padi di Ladang Demonstrasi pada hari Perasmian Pusat Latihan pada 16 Oktober, 1984.

Satu demonstrasi teknik pengurusan air kepada petani-petani.