(2). Summary of Training Results:

1). Results in 1987

The following five courses were opened.

Namely; 1. Three "Basic Mechanization" courses (for student and staff members of the satellite fields).

2. One "Mechanical Harvest" course (for staff members of the satellite fields).

3. Nine "Outside Extension" seminars (For key-farmers, agr.coop.- staff members, etc).

In all, the number of trainees accepted was a total of 603.

2). Results and achievement in 1988-1989.

1. Achievement rate to target:

Along with the direction of the "master plan", positive training activities were commenced. The results of these are summarized briefly as follows:

(1988) A total of 70 courses, 2,069 men, 6,369 man days accepted

(1989) A total of 58 courses, 2,125 men, 5,733 man days accepted

---

Sum 1 128 courses, 4194 men,12,102 man days

(Refer to Appendix-2)

In this regard the following level of achievement rate 3 to the target ("master plan" 2) can be computed:

	Achievement Rate
* A total of opened courses	168 %
* A total of accepted persons	210 %
* A total of counted man days	150 %

(Notes) 3 = 1 - 2 x 100

2. A brief description of the training courses

(i) The kinds of courses; the number of their repetitions, durations and number of days per course, and the total of accepted persons etc. were listed in detail in :-

Appendix-2.

Appendix-3.

In regard to the number of accepted trainees, the "Basic Mechanization" course has counted a maximum number of trainees (436 men, 23 repetitions) among the given eleven kinds of courses. And, the key farmer course (491 men, 26 repetition) has followed.

It has been noticed that the "Outside Extension" seminars were held successfully at many local spots; attended by a total of 2,574 key farmers etc..

In the autumn of 1988, an "Agricultural Machinery Maintenance" course was held with 12 repetitions and a total of 213 trainees, while a "Mechanical Harvest" course was also held with fewer repetitions and trainees (three times, 57 men). Because of an insufficiency in available dormitory space only one course was given at a time.

taught through four teaching methods: practice, demonstration, lecture and discussion.

(ii) Level of subject

The levels of each subject in curriculum varied widely according to the course. It was set according to the qualifications of the trainees and kind of course.

For example, "the Advanced Mechanization" course took the high level of contents on each subjects such as "The Strategy of Rice Cultivation Improvement in Egypt" or "An Outline of the Mechanical Direct Seeding Method & Its Problems to be Countermeasured" etc.. On the other hand, the "Key Farmer" course had the essential and practical level with discussions.

(iii) On Composition of Curriculum

It was aimed at a higher percentage of practice (more than 50% of total hour-units), and a lower percentage of lectures (less than 50% of total hour-units), because a clearer understanding of technical know-how can be gained through the "practical" aspects in the field or workshop during training.

(iv) Some modification of curriculum

Some modification of the original curriculum is sometimes necessary, however, due to the eager requests of the trainees. Those adjustments have been successfully accomplished by the instructor's efforts.

4. Evaluation activity

(i) For the purpose of improving both the curriculum and the

(ii) Number of trainees according to courses and Governorates which sent the trainees.

The following Table 1 shows the distribution of trainees according to course and sponsoring Governorate.
It can be pointed out as follows;

1. Comparison by course

(Max).... Key Farmer course (491 men) = "Basic Mechanization course (436 men) > "Machinery Maintenance" course (213) > "Advanced Mechanization" course (131 men) > > Agricultural Machinery" course (58 men) = "Mechanized Harvest" course (57 men)..... (Min)

2. Comparison by Governorate:

(Max) .... Kfs. (665) > Beheira (208) = Dakkahlia (204) > > Sharquia (162) > Damietta (76) = Gharbia (71) ...(Min)

Here it has been noticed that about half of the total accepted trainees came from the Kafr El-Sheikh Governorate, while fewer trainees came from the Damietta, Gharbia and Sharquia Governorates.

And also, the high rate of concentration of the number of trainee in Kfs. Gov., has been seen in the case of the "Key Farmer" course and the "Agr. Machinery Maintenance" course.

3. Training Curriculum

(i) Training curriculum

In these six main courses the wide range of training subjects spanned from "actual methods of seed-treatment" to "machinery-repair" or "economic evaluation methods" and were

Table - 1 Accepted Number of Trainee by Main 6 Courses

and six (6) Governorates. (1988 - 1989)

Course / Gov.	Basic Mech. Course	Agr. Maintenance Course	Mech. Harvest Course	Advanced Mech. Course	Key farmer Course	Agr. Machine Course
1. Kafr Gov.	109	194	-	39	305	18
2. Dakahlia Gov.	85	-	-	53	66	-
3. Damietta Gov.	18	-	18	-	40	-
4. Sharquia Gov.	73	-	20	29	40	-
5. Behiera Gov.	80	19	19	10	40	40
6. Gharbia Gov.	71	-	-	-	-	-
Total	436	213	57	131	491	58
(%)	(31)	(15)	(4)	(9)	(37)	(4)

instructor's teaching methods, a series of evaluation activities were taken carefully as one part of the curriculum itself.

a). Paper-test or identification-test..(technical matter)

b). Opinion of trainee.....(in general)

(ii) On this point the records of those evaluation results have been arranged and well summarized.

(iii) All the trainees have been awarded a Training Certificate on the final day of the course in the names of the General Director of AMRI and the Site-Manager of RMC. An honor trainee (the heighest score in the paper test) in each course could win a small prize.

(iv) The above mentioned evaluation activities are surely useful and important for both the improvrement of the instructor's teaching capabilities and the trainees' motivation and interest.

5. Supplementary information

(i) During these recent two years various kinds of text books were published dealing with mechanical rice transplanting cultivation technology, in English and in Arabic. (Refer to Page-).

Among them, the latest one is "Mechanical Nursery Text Book" (Arabic) for the "Key Farmer" course and the "Outside

Extension" seminar.

(ii) Third country training

A third country training course on "Rice Cultivation" for African participants (EICA sponsored by JICA) was successfully held, sharing a part of the course at RMC.

In 1988, 16 participants from 10 countries were trained for 3 weeks.

In 1989, 11 participants from 8 countries were trained for 3 weeks.

It was recognized that most of participants showed a keen interest and an active attitude in studying the new technology (mechanical system) under Egyptian circumstances. Such situations have been clearly described on the "Report" which was written by Dr.H.SAKURAI (short term Japanese lecturer in EICA. 1988)

(3). Recommendations

(i). One guide paper entitled "Expected Instructor's Mind" was written all instructors, just after the "Master Plan on Reinforcement of Training" had been completed in 1988. (Refer to Appendix-4).

In it the instructor's mind, attitude and behaviour (4 items) and several notices (8 items) should be considered as a standard model for teacher's conduct.

All the instructors are kindly and strictly expected to take notice and be familiar with this standard model.

(ii) The following points were made, based upon instructor's reviews of their experiences:

a. Practice-unit hours should be dramatically increased.
b. Practice time for assembling and disassembling of farm machinery should also be increased.
c. Many more training materials (small leaflets) should be prepared on each subject.
d. Lecturing should be done by both engineers and agronomists.
e. The stipulated or scheduled time for each class should be strictly adhered to classes should be punctually started, and finished on time.
f. Selection of the instructors should be strictly on a high level in order to assure excellence in training. This should be given the highest priority.

These points are helpful to increase the vital power so

that it is also recommended to realize them concretelly.

(4). Proposals for the near future:

1) To make the "Secondary Master Plan on Training" as quickly as possible, immediately after the close of the RMPP.

2) To make a new training text book entitled on "Mechanical Rice Direct-Seeding Cultivation Technology".
If possible, this had better be given the highest priority!

Appendix-1

MASTER PLAN ON TRAINING

For these two years (1988-89), the following targets were set as a "Master-Plan on Training".

*Total training courses: 76 *Total number of trainees: 1,992

*Total numbers of man x day accepted 8,072

(1) Training Program during 1988

1) "Basic Mechanization" course :

* 12 days x 20 trainees x 6 replications = 1,440 man.day

* Date: March 5th - June 2nd.

March			April			May		
No.	Date	Aimed at	No.	Date	Aimed at	No.	Date	Aimed at
1.	5th-17th	Kafr El-Sh-eikh	3.	2nd-14th	Gharbia	5.	7th-19th	Sharquia
2.	19th-31st		4.	16th-28th	Daka-hlia	6.	21th-2nd/Jun.	Behira Dami-etta
2 Courses 40 Trainees			2 Courses 40 Trainees			2 Courses 40 Trainees		

2) "Advanced Mechanization" course:

* 6 days x 20 trainees x 2 replications = 240 man.day

* Date: spring

* Aimed at Kafr El-Sheikh Governorate (Extension Officer who graduated from "Basic Mechanization" course)

3) "Harvesting" course:

* 6 days x 12 trainees x 8 replications = 576 man.day

*Date: autumn (September 3rd - October 27th)

September			October		
No.	Date	Aimed at	No.	Date	Aimed at
1.	3rd - 8th	Kafr El- Sheikh	5.	1st - 6th	
2.	10th - 15th		6.	8th - 13th	Other-
3.	17th - 22nd		7.	15th - 20th	Governo-rate
4.	14th - 29th		8.	22nd - 27th	
	4 Courses	48 trainees		4 Courses	48 trainees

4) "University Student" course

* 6 day x 20 trainees x 8 replications = 960 man.days

* Date: summer vacation (July - August)

J U L Y			A U G U S T		
No.	Date	Aimed at	No.	Date	Aimed at
1.	2nd - 7th	(Not-	5.	6st - 11th	(Not-
2.	9th - 14th	yet-	6.	13th - 18th	yet-
3.	16th - 21st	decided)	7.	20th - 25th	decided)
4.	23rd - 28th		8.	27th - 1st/Sept.	
	4 Courses	80 trainees		4 Courses	80 trainees

* Aimed at eight University

v) "Machinery Maintenance & Repair" course:

* 4 days x 20 trainees x 4 replications = 320 man.days

* Date: 4 courses (2 courses in spring and 2 courses in autumn)

6) "Seminar" course: (Outside Extension Seminar)

* 1 - 2 days x 50 trainees x 10 replications = 500 man.days

* Date: 10 courses in total. (5 courses in spring and 5 courses in autumn)

(2) Training progam in 1989 .... Same as in 1988.

Appendix-2.

Comparison between Training Schedule & Result (1987 - 1989)

Kinds of Training Course	1987						1988						1989					
	No. of Course		No. of Trainee			Day No.	No. of Course		No. of Trainee			Day No.	No. of Course		No. of Trainee			Day No.
	Sched-ule	Result	Sched-ule ①	Result ②	Rate ③÷②/①	per course	Sched-ule	Result	Sched-ule ⑦	Result ②	Rate ③÷②/⑦	per course	Sched-ule	Result	Sched-ule ①	Result ②	Rate ③÷②/①	per course
1. Mechanical Nursery Course																		
2. Mechanical Planting Course													-	1	-	21	-	4
3. Basic Mechanization Course - Satellite	1	1	15	17	113	14												
4. Basic Mechanization Course - Extension Eng.	1	1	15	19	126	6	6	14	120	256	218	6	6	9	120	171	143	6
5. Univ. Student Course	1	1	20	27	135	6	8	9	160	159	99	6	8	14	160	333	208	6
6. Mechanical Harvesting Course	1	1	30	40	133	3	8	3	96	57	59	6	8		96			
7. Agr. Machinery Maintenance Course							4	12	80	213	266	6	4		80			
8. Technical Course																		
9. Advanced Mechanization Course							2	7	40	91	228	6	2	3	40	60	150	6
10. Statistics Analysis Course							-	1	-	7	-	6						
11. Key Farmer Course							-	11	-	190	-	3	-	14	-	301	-	3
12. General Agri. Machinery Course - O & M													-	3	-	58	-	6
13. Agr. High School Course													-	5	-	195	-	2
14.																		
Total (A)	4	4	80	103	129		28	57	496	979	195	3-6)	28	49	496	1.139	225	(2-6)
15. Farmer Visit Course							-	4	-	90		1	-	1	-	24	-	1
16. Outside Seminar Course	10	8	500	500	100	1	10	9	500	1.000	200	1	10	8	500	960	96	1
Total (B)							10		500	1.090	218		10	9	500	984	98	1
Grand Total C = (A) + (B)	14	12	580	603	104%		38	70	996	2.069	208%		38	58	996	2.125	213%	

Appendix-3.

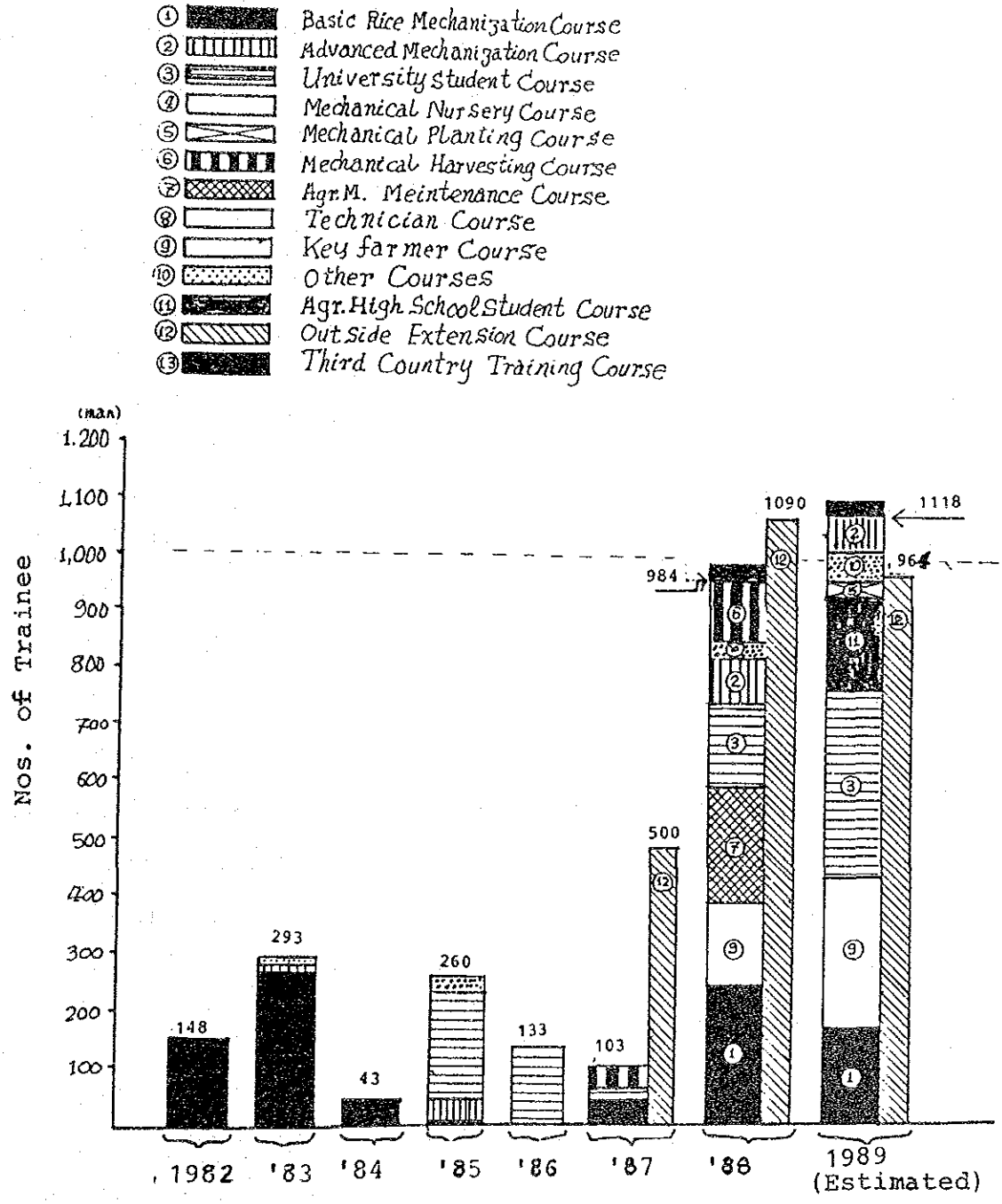


Figure. Yearly accepted number of Trainee and Participant for these 8 years (1982 - '89)

Appendix-4

INSTRUCTOR'S MIND

(I) Instructor's mind, Attitude and Behaviour:

1) It should be taken for granted that an instructors is the highest authority for his subject. Errors or mistakes of any kind in his teaching should not be allowed.

2) An instructor must not be allowed to smoke in front of his class. He must be a model of good personal habits and tidy grooming. He must wear appropriate clothing for teaching his class.

3) During "mechanical training every precaution must be taken by the instructor to prevent any kind of injury to trainee.

4) Classes must commence on time, and they must also finish on time. Schedules must be adhered to, punctually.

(II) Several Notices on Proceeding Practices:

5) Before commencing with practical procedures, especially when using any kind of machinery, give a short briefing on the subject so that your trainees will understand what the lesson is about and what they are going to do and learn.

6) Some simple form of physical exercise -such as jogging- is desirable for the class as a whole to participate in before starting any practical procedures. This can be likened to "warming-up" an engine before putting it into gear.

7) Instructors are kindly requested to give each trainee personal attention and consultations, as needed or requested. This "personal touch" will give the feeling that he is receiving "man to man" training with the result,

it is hoped, that his results in the class will be better.

8) During each class some time should be set aside for questions and ansewrs.

9) Speak slowly, clearly and distinctly. Use a loud enough voice that every trainee can hear every word you say, without straining. Repeat your explanation or demonstration if necessary. Your primary responsibility to the trainee is that they all learn the lesson you are teaching. Remember: if a trainee fails to grasp the point you are trying to put across, it may be your fault: for going on too quickly, or going a poor explanation in the first place.

10) Continuous stress and strain is not advantageous to the learning process. Try to relieve the tension in the "classroom situation" by injecting some small humor, from time to time, into your lectures. Give your trainee a chance to "breath" and to refresh their attention.

11) Before concluding the class the instructor should a lot ample time to the trainees to ask any final questions they may have regarding the training they have just received.

12) During this last session it is also important that the instructor ask the trainees some questions in order to check his own success as an instructor. In other words, did the instructor accomplish his objectives to pass on valuable training and understanding of the subject he taught or did he merely waste the trainees time?

2. Agricultural Machinery Maintenance

The total number of farm machines donated by the Japanese Government is 172. It is very important and necessary to keep those machines in good condition. The kind of maintenance that should be done is a difficult problem. During the frequent discussions among the Japanese staff at the meeting, the necessity of regular inspections, maintenance and repair, and inventory control of parts were emphasized.

Fig.1 shows the schematic diagram of the necessary factors for maintenance and repair. Items in double frames are specially, and strongly, advised.

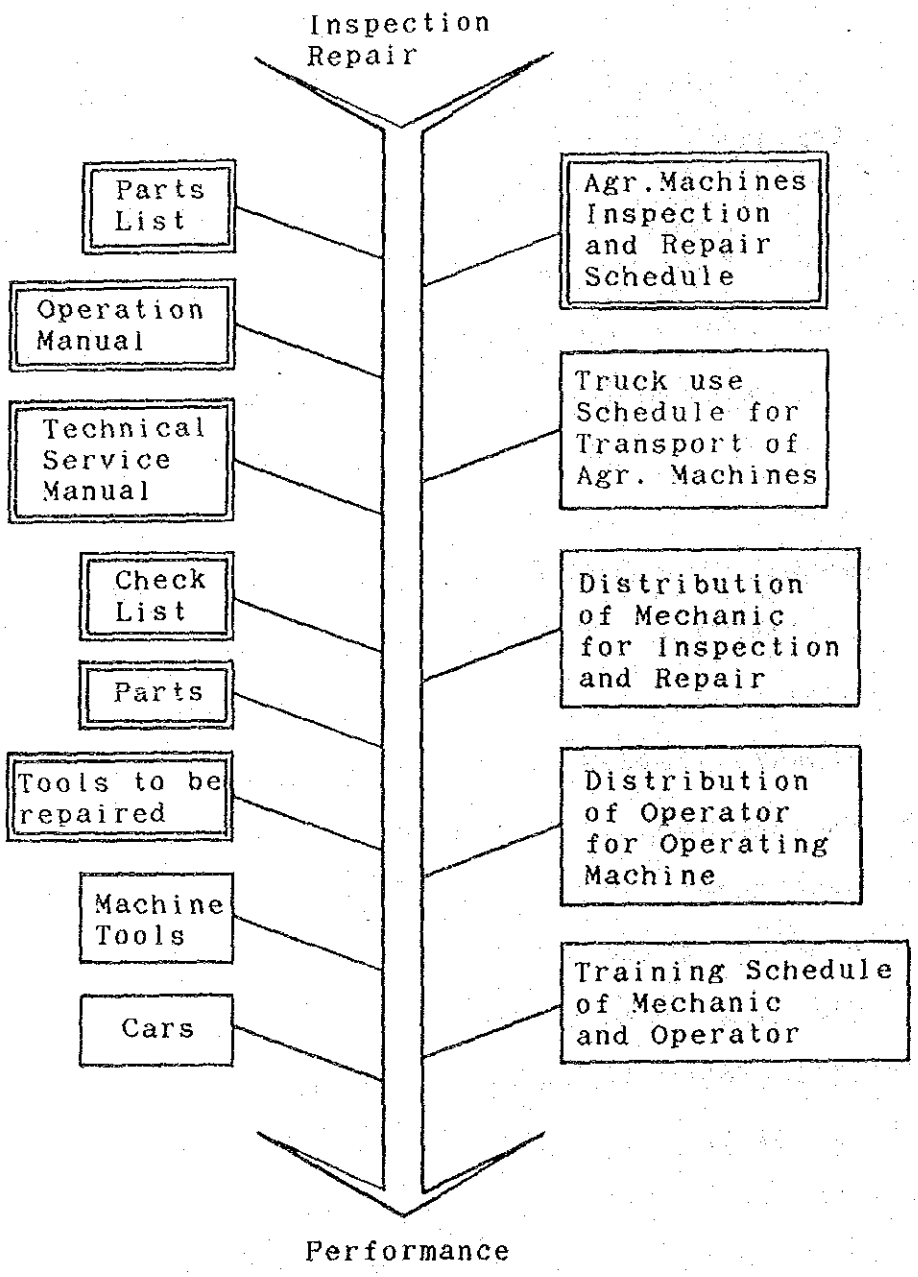


Fig.1 Schematic diagram of the necessary factors for maintenance and repair.

(1) Facility for Storing Farm Machines

A suitable facility for storing agricultural machines after the completion of maintenance, inspection and repairs should be arranged. If the machines are left outside, damage done by rain, dust and sun light will shorten the life of those machines. Also, the deterioration of oil is promoted; consequently there is an invasion of dust into the engine, fuel tank and transmission case. This should be prevented. It has happened that machines have been left on an irregular surface of the ground. The weight of the machines was not distributed uniformly and sometimes they rolled over. To eliminate this kind of problem, the facility for big scale machines like tractors and combine harvesters should be paved with concrete, and the roof should be newly constructed. (Fig.2-7)

(2) Seasonal Maintenance and Repair in Relation to the "Crop Operation Calender"

When the regular inspections or checks of agricultural machines are not done, they can not be ready for use in time for seasonal operations. Also insufficient trouble shooting leads to accidents. To avoid these kinds of problems, maintenance and repairs must be done before the season comes; the timing of the repairs should be considered.

With respect to the operating season and the period of machine use , discussions and adjustments for use were made and the schedule for maintenance and repairs was planned at the beginning of the year. By following this schedule, the annual repairments labor was more evenly distributed. In addition to

the effect of making the table for maintenance and repair , the mistakes in trouble shooting were greatly reduced. (Table.1 and Fig.9) Furthermore, we supplemented deficient tools as shown in Tables. 2, 3 and 4 and Fig.8.

(3) Arrangement of Technical Service Material

The technical materials described here mean the parts lists, the operation manuals, and the technical service manuals. These materials can be used for the maintenance and repairs of the machines, however they can easily be lost or damaged during long term usage.

In 1989 a check was done of these materials. Some of them were renewed or completely arranged. The results was to a total of 91 separate items: parts lists, operation manuals and technical service manuals. One man to be in charge of managing these materials was selected. The cabinet in which they are kept was locked, and a booklet was prepared in which to record the names of the persons who borrowed the material items, the date when they borrowed and returned them. By using this system, all the materials are being well managed at present (February 1990). (Table 5 - 8 and Fig.10)

(4) Arrangement of the Schedule for Maintenance and Repairs

For assuring the complete maintenance and repairs of agricultural machines, a schedule, a technical manual and a list for checking the part to be fixed are generally needed. This list can be used as the record for the machines in order to know who made the repair, when it was made, what part was

replaced, etc. The responsibility for the machines condition can there by be laid on the mechanics signing the record. This system should also assure that the waste of oil and parts can be avoided. By introducing this system, the trouble can be prevented and the machines can always be kept in good condition. (Table 9 - 20)

(5) Feasible Management of Parts

They must undergo a regular process of repair and maintenance. More or fewer spare parts may be needed, according to repairs required. Spare parts should be kept in stock for this purpose.

Most of machines donated from the Japanese Government are made in Japan.

There are three methods of managing the spare parts: (1) the note book method, (2) the card method, and (3) the computer management system. Of these the computer management system can be recommended because of the great number of parts that must be kept track of. For example, one tractor consists of 18.000 parts, and in the combine harvester there are 20.000. It is hard work and takes a lot of time to confirm the inventory of the total number of spare parts, the prices, the number of orders, and the dates of purchases and shipments. The computer management system makes this possible. The technology transfer for introducing this management system was tried. However, there was not enough time for entering the data for all of the machines. Therefore, the technical method

on how enter input data was taught. This must be continued. The output table is shown in table 21. Furthermore, we inquired about machines for which we can buy parts in Egypt, the result is as shown in table 22.

Table. 1.

1990 YEAR AGRICULTURE MACHINES INSPECTION & REPAIR SCHEDULE (1989.12.17)

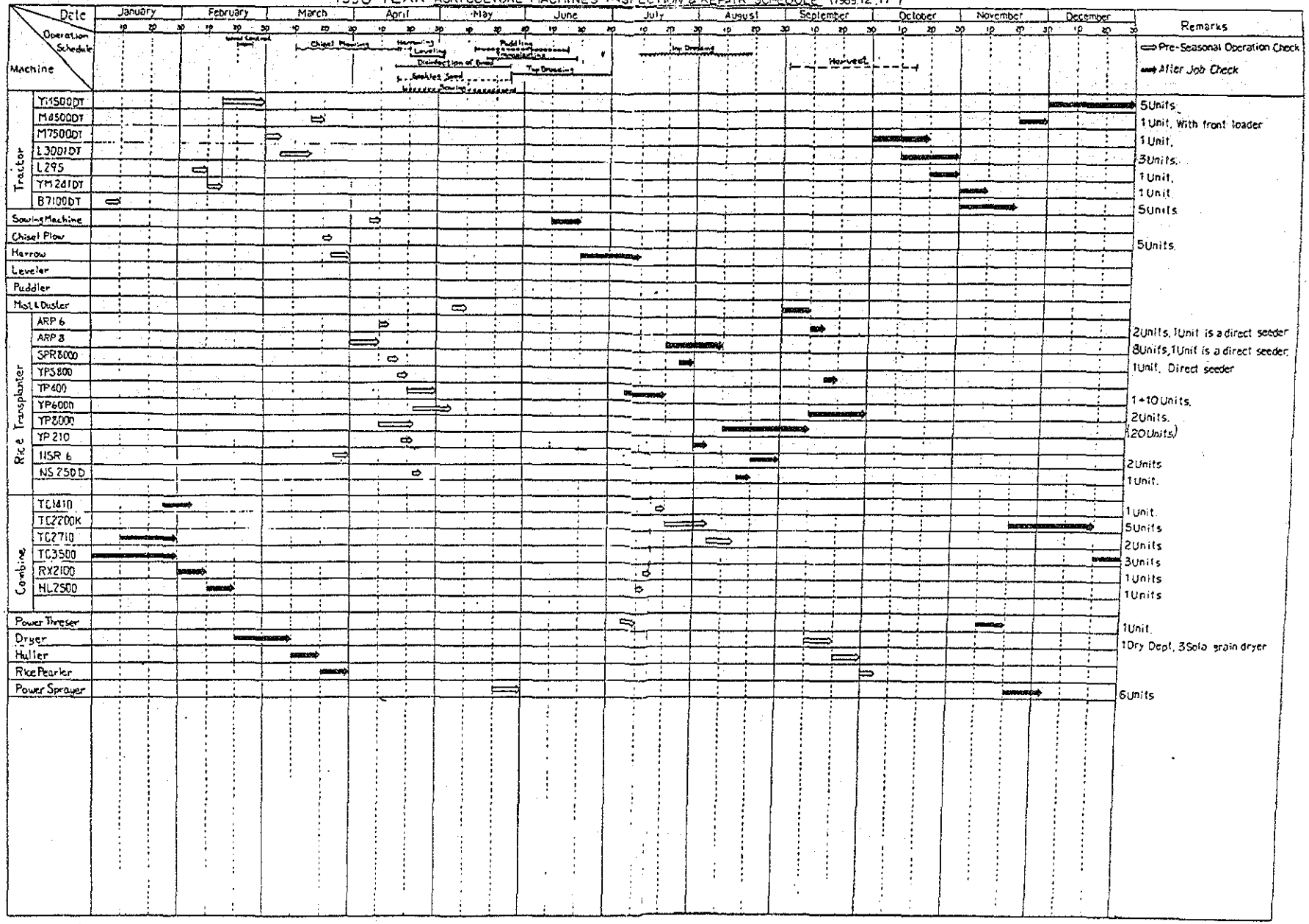


Table. 2.

Consolidation of Tools
Supplemental Tools List
****

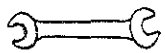
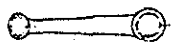
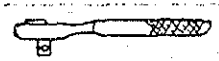
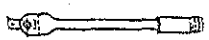
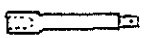
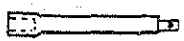
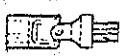
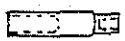
Kind of Tool		Size and Quantity Size unit : mm
Open Ended Spanner		(6- 7)x2 (8- 9)x2 (10-11)x2 (12-13)x2 (14-15)x2 (16-17)x2 (18-19)x2 (20-22)x2 (21-23)x2 (24-26)x2 (25-27)x2 (30-32)x2
Offset Wrench		(6- 7)x2 (8- 9)x2 (10-11)x2 (12-13)x2 (14-15)x2 (16-17)x2 (18-19)x2 (20-22)x2 (21-23)x2 (24-26)x2 (25-27)x2 (30-32)x2
Socket Wrench Set		10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 27 30 32
		250mm Reversible Ratchet Handle x1
		250mm Sliding T-Bar x1
		420mm Speeder Handle x1
		125mm Extension Bar x1
		250mm Extension Bar x1
		Universal Joint x1
Spark Plug Socket		1
- Screw Driver		Small x 1 Medium x 2 Large x 2
+ Screw Driver		Small x 1 Medium x 2 Large x 2

Table. 3.

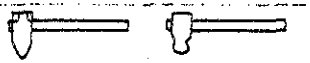
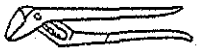
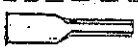
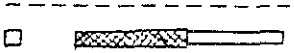
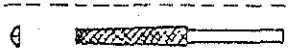
Hammer		Medium Size x 2 Large Size x 1
Water Pump Plier		Medium Size x 1 Large Size x 2
Circlip Plier for Shaft		Medium Size x 1 Large Size x 1
Circlip Plier for Hole		Medium Size x 1 Large Size x 1
Chisel Set		1
		1
		1
		1
		1
		1
Big Chisel		1
File Set		1
		1
		1
		1
		1

Table.4.

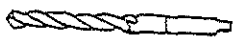
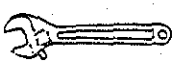
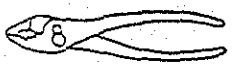
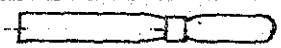
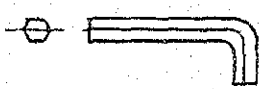
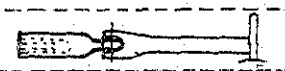
Drill Set		1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10
Electric Wire Wrench		1
Adjustable Angle Wrench		12 inch (= 300mm) x 1
Slip Joint Combination Plier With Cutter		Large x 1 Small x 1
Cutting Plier		Middle x 1
Scraper		
Hexagon Wrench		1.5 2.0 2.5 3.0 4.0 5.0 5.5 6.0 8.0 10.0
Spark Plug Wrench		

Table.5.

Checking Date : Apr.18,1989
Aug.13,1989

T E C H N I C A L M A N U A L L I S T

O : Complete

X : Missing

* : Japanese Manual

T R A C T O R

Kind of Manual / Model	Parts List	Technical Service Manual	Operation Manual
Kubota B7100D	O	O<—*	O
Kubota L295	O	O<—*	O
Kubota L3001DT	O	*	O
Kubota M4500DT	O	O<—*	O
Kubota M7500DT	O	O<—*	O
Yanmar YM241DT	O	O<—*	O
Yanmar YM500DT	O	O	O

R I C E T R A N S P L A N T E R

Kind of Manual / Model	Parts List	Technical Service Manual	Operation Manual
Yanmar YP210	*	X	O<—*
Yanmar YP400	O	X	O<—*
Yanmar YP6000	*	O<—X	O
Yanmar YP8000	O	O<—X	O
Yanmar YPS8000	X	X	X
Yanmar ARP6	*	*	O
Yanmar ARP8	O	*	O
Kubota NS250D	*	X	*<— X
Kubota NSR6	O	X	*
Kubota SPR8000	*	X	*

Remarks: Show the workshop manual of Kubota
Gasoline Engines for the engine of NSR 6 model

Table.6.

Checking Date : Apr.18,1989
Aug.13,1989

T E C H N I C A L M A N U A L L I S T

O: Complete

X: Missing

*: Japanese Manual

C O M B I N E & B I N D E R

Kind of Manual / Model	Parts List	Technical Service Manual	Operation Manual
Yanmar TC1410	*	*←X	*←X
Yanmar TC2200K	O	O←*	O
Yanmar TC2710	O	*	O←*
Yanmar TC3500	O	X	O←*
Kubota RX2100	O	X	*←X
Iseki HL2500	O	X	X
Yanmar YB602L	*←X	X	X
Kubota HE50A	O←X	X	*←X

O T H E R M A C H I N E S

Kind of Manual / Model	Parts List	Technical Service Manual	Operation Manual
Mist Duster.			
Maruyama MD220	O←X	*←X	O←X
Reaper.Kubota AR120	O←X	O←X	X
Dry Depot.Yamamoto			
SED-3EL	O←X	*←X	O←X
Trencher. Kawabe			
C45LH	O←X	X	O←X
Harvester.Kubota			
HH-701	*←X	X	*←X
Generator.Yanmar			
YSG3000B	O←X	O←X	O←X
Generator.Yanmar			
YSG2000BZ	O←X	O←X	O←X
Pump. Kubota KGP-30	O←X	O←X	X
Pump. Kubota KGP-40	O←X	O←X	X
Pump. Kubota			
DSV-L-1902-BC	O	O←X	X
Pump Yanmar YKS5D	O←X	X	O←X

Table 7.

Checking Date : Apr. 18. 1989
Aug. 13. 1989

T E C H N I C A L M A N U A L L I S T

O : Complete
X : Missing
* : Japanese Manual

O T H E R M A C H I N E S

Kind of Manual / Model	Parts List	Technical Service Manual	Operation Manual
Diesel Welder Yanmar YTW-280	O	X	X
Soil Crusher with Siever,Kubota	X	X	X
Bull Dozer,Komatsu D-20	O	O←X	O←X
Rice Seeding Machine Kubota SR-700S	*←X	X	*←X
Rice Mill Unit,Yanmar SU-500	O←X	X	O←X
Rice Pearling Machine Satake SB10D	X	X	X
Power Tiller,Yanmar YK600	O	O	O

E N G I N E S

Kind of Manual / Model	Parts List	Technical Service Manual	Operation Manual
Diesel Engine,Kubota KND1500	O	O	O←X
Diesel Engine,ForDSV-L Kubota	X	X	X
Diesel Engine,ForYTW-280 Yanmar TS-180C	O←X	X	O←X
Diesel Engine,ForYKS5D Yanmar TS105	O←X	X	X
Diesel Engine, SB10D	X	X	X

Table 8

Checking Date : Apr. 18. 1989
Aug. 13. 1989

T E C H N I C A L M A N U A L L I S T

O: Complete

X: Missing

*: Japanese Manual

IMPLEMENT Model	Kind of Manual	Parts List	Technical Service Manual	Operation Manual
Matsuyama, Drive Harrow HB-2200B		O←X	X	O←X
Matsuyama, Drive Harrow HE-2800B		O←X	X	O←X
Matsuyama, Rotary Tiller FM1702F-BC		X	X	X
Matsuyama, Rotary Tiller SX1700H		O←X	X	O←X
Matsuyama, Rotary Tiller DC-1800S		O←X	X	O←X
Matsuyama, Rotary Tiller MX2000		O←X	X	O←X
Kubota, Rotary Seeder TS401D2		X	X	X
Kubota, Front Loader For M4500DT TLH7000DT-A		O←X	X	O←X
Star, Hay Baler THB2020		O←X	X	O←X
Star, Broodcaster MBC2620		O←X	X	O←X
Star, Dump Trailer HD9W		O←X	X	O←X
Star, Manure Wagon TFM1000		O←X	X	O←X
Maruyama, Power-Sprayer CGP-2-1000		O←X	X	X

IMPLEMENT Model	Kind of Manual	Parts List	Technical Service Manual	Operation Manual
Kobashi, Paddy Harrow PHN322		O←X	X	O←X
Maruyama, Boom Sprayer, BSM-620SLT		*←X	X	*←X

Table. 9.

PERIODIC CHECKING LIST (After job is over)

TRACTOR

MODEL		DATE	/ /
HOUR METER			
CHECKER		APPROVER	

Checked ✓ | Adjusted △ | Overhauled ○ | Chenged Part ×

	Inspection Item	Description	Mark
Engine	Engine oil	Every 100hr. Change oil	
	Engine oil filter	Every 200hr. Replace filter	
	Engine oil pressure		
	Engine crank case interior (Washing)	Every 300hr	
	Valve clearance		
	Fuel injection nozzle		
	Fuel filter	Every 100hr. Drain element & Every 300hr. Replace filter	
	Fuel tank cap	Every 600hr. Replace	
	Fuel leak		
Cooling System	Air cleaner		
	Air intake system		
	Front gril		
	Radiator screen		
	Radiator core		
	Inside radiator	Every 600hr. Washing	
	Water hose		
	Water pump & pump belt		
	Water separater	Every 600hr. Replace element	
	Fan & Fan belt		
Electric System	Battery electrolyte level		
	Electrolyte specific gravity	Every 300hr.	
	Terminal corrosion		
	Alternator		
	Alternator drive belt		
	Charging		
	Indicator lamps & gauges		
Transmission	Transmission oil	Every 300hr Change oil	
	Oil filter	Every 200hr. Replace filter	
	Oil suction screen	Every 300hr. Cleaning screen	
	Change levers		

	Inspection Item	Description	Mark
Hydraulic system	Hydr. oil (transmission) oil	Every 300hr Change oil	
	Oil filter	Every 200hr. Replace filter	
	Oil suction screen		
	Oil leak		
	Full pressure during relief (kg/cm²)		
	Hydraulic control valve		
	Control levers		
	Lift cylinder		
Steering System	Steering wheel free travel		
	Power steering oil		
	Oil pump		
	Oil leak		
	Tightness of steering system	Every 100hr	
	Front alignment	Camber, Caster, Toe-in	
Front Axle & Wheel	Front axle center pin		
	Front axle oil	Every 200hr. Change oil	
	Air pressure of tyres		
	Front wheel hubs		
	Front tyres, rims & disks		
Rear Axle & Wheel	Rear axle oil		
	Rear tyres, rims & disks		
	Air pressure of rear tyres		
Brake	Brake pedal free travel		
	Brake disk or shoe		
	Parking brake		
	Brake oil		
	Brake oil leak		
Clutch	Free travel of clutch pedal		
	Clutch disk		
	PTO clutch		

	Inspection Item	Description	Mark
3 Point Hitch, Drawbar & PTO	Top link		
	Lower links		
	Lifting rods		
	Check chains		
	Top link bracket		
	Lower link brackets (Hinge pin)		
	Drawbar		
	Drawbar bracket		
	PTO shaft (spline)		
	Turn-buckle of check chains		
Greasing	Front axle center pin support (front side & rear side)		
	Tie-rod ends		
	Drag-rod ends		
	King pins		
	Clutch pedal shaft		
	Brake pedal hinge		
	Hydraulic draft control hinge		
	Top link ends		
	Lifting rods		
	Turn-buckle of check chains		

Table. 10.

التاريخ		المورد	
		عدد الساعات	
المراجع		الفاحص	

قائمة الفحص الدورى للجرار

× غير الجزء	— عمره كاملة	0 ضبط	/ فحص

العلامه	الوصف	نقاط الفحص
		ثلاث نقط اشياء، قضيب الجر، عمود الادارة الخلفي
		اليوصه العليا
		الوصلات السفلي
		قضبان الرفع
		جنازير فحص
		زراع (كابولي) الوصله العليا
		أزرع (كابولي) الوصلات السفلي
		قضيب الجر
		زراع قضيب الجر
		عمود الاداره الخلفي
		قضبان الرفع
		شدادة جنازير الفحص
		التشحيم
		بنز مركز ألاكس الأمامي
		(الأمامي ، الخلفي)
		قضبان التوجيه
		قضبان النقل للتوجيه
		البنوز الرئيسيه
		عمود دواسة الدبرياج
		وصلة دواسة الفرامل
		وصلة تحكم زراع الهيدروليك
		نهايات الوصلة العليا
		قضبان الرفع
		شدادة جنازير الفحص

العلامه	الوصف	نقاط الفحص
		الجهاز الهيدروليكي
	غير الزيت كل ٣٠٠ ساعة	زيت الهيدروليك
	غير الفلتر كل ٢٠٠ ساعة	فلتر زيت
		مصفاة سحب الزيت
		متشرب الزيت
		الضغط الكابل أثنا ١٠ الرجوع كجم/سم٢
		جمام التحكم الهيدروليكي
		أزرع التحكم
		اسطوانة الرفع
		جهاز القيادة
		المشوار الحر لعجلة القيادة
		زيت قدرة عجلة القيادة
		طلمبة الزيت
		مشرب الزيت
	كل ١٠٠ ساعة	احكام ربط عجلة القيادة
	زاوية الكابر الكاستر	الانحراف الأمامي
		الاكس الامامي، العجل
		بنز مركز ألاكس الأمامي
		زيت ألاكس الأمامي
		شفط نفخ العجل
		جنط العجل الأمامي
		قرص وحافة العجل الأمامي
		الاكس الخلفي
		زيت ألاكس الخلفي
		قرص وحافة العجل الخلفي
		شفط نفخ العجل الخلفي
		الفرامل
		المشوار الحر لدواسة الفرامل
		قبقاب الفرامل
		فرامل الانتظار
		الدبرياج
		المشوار الحر لدواسة الدبرياج
		قرص الدبرياج
		دبرياج عمود الاداره الخلفي

العلامة	الوصف	نقاط الفحص
		المحرك
	كل ١٠٠ ساعة غير الزيت	زيت المحرك
	كل ٢٠٠ ساعة غير الفلتر	زيت فلتر المحرك
		علبة مرفق المحرك
		علبة مرفق المحرك
		الفسيل
		خلوص الكاتبات
		رشاش حقن الوقود
	غير عنصر الترشيح بعد ١٠٠ ساعة وغير الفلتر بعد ٣٠٠ ساعة	فلتر الوقود
	غير كل ٦٠٠ ساعة	غطاء تنك الوقود
		مشرب الوقود
		جهاز التبريد
		منظف الهواء
		جهاز سحب الهواء
		الشبكه الأمامية
		مصفاة الرديياتير
		قلب الرديياتير
	تنظيف بالفرشة كل ١٠٠ ساعه	مابداخل الرديياتير
		خرطوم المياه
		طلمبة المياه
	غير العنصر كل ٦٠٠ ساعة	فاصل (حاجز) المياه
		المروحة ، سير المروحة
		دورة الكهرباء
		مستوى الماء في البطارية
	كل ٣٠٠ ساعة	الوزن النوعي
		ألواح البطارية
		المولد الكهربائي
		سير الدينامو
		الشحن
		لمبات البيان ، المعدات
		نقل الحركة
	غير الزيت كل ٣٠٠ ساعة	زيت نقل الحركة
	غير الفلتر كل ٢٠٠ ساعة	فلتر الزيت
	نظف المصفا كل ٣٠٠ ساعه	مصفاة سحب الزيت
		أزرع التغيير

Table. 11.

CHECK LIST FOR PRE-SEASONAL OPERATION TRACTOR

MODEL		DATE	/ /
HOUR METER			
CHECKER		APPROVER	

Checked ✓ | Adjusted △ | Overhauled ○ | Changed Part ×

	Point to check	Mark
Engine	Engine oil	
	Oil leak	
	Unusual noises	
	Coror. of exhaust gas	
	Air cleaner	
	Fan belt & Fan	
	Cooling water level	
Fuel	Fuel	
	Fuel filter	
	Fuel leak	
Electric System		
	Battery electrolyte level	
	Alternator belt	
	Condition of head lamp	
	Condition of flasher lamp	
	Condition of work lamp	
	Indicator lamps & Meters	
	All lamps stop glowing when engine runs (Without oil pressure & charging)	
	Oil pressure lamp & charging lamp glow when main switch is turned one step position	

	Point to check	Mark
Bracke & Clutch	Brake pedal free travel	
	Even adjustment of both left & right brake pedals	
	Effectiveness of brake	
	Parking brake free travel	
	Effectiveness of parking brake	
	Clutch pedal free travel	
	Complete engagement of clutch	
Steering System	Steering Wheel	
	Steering wheel for excessive play	
	Heaviness of steering wheel in turnning	
	Vibration of steering wheel in running	
	Power steering oil	
	Oil leak	
Transmission	Transmission oil	
	Oil leak	
	Unusual noises	
	Smoothness of lever change	
Hydraulic System	Hydraulic oil(Transmission oil)	
	Oil leak	
	Condition of lift arm motion	
	Smoothness of control levers	

	Point to check	Mark
Other Point of Lubrication	Front axle case oil	
	Rear axle case oil	
	Grease of front axle center pin support	
	Grease of tie-rod ends	
	Grease of drag-rod ends	
	Grease of king pins	
	Grease of clutch pedal shaft	
	Grease of hydraulic draft control hinge	
	Grease of top link ends	
	Grease of lifting rods	
	Grease of check chains	

Table. 12.

" قـائمة الفحص الـنـــوى ـ المبدئي لتشغيل الجـرار "

التاريـــخ		الموديل	
		عددالساعات	
المراجـع		الفاحص	

غير الجزء	×	عمره كامله	△	أضبط	○	أفحص	√

العلامة	نقـــط الفحـــص	
	علبة زيـت الاكـس الامـامى	نقاط أخرى للتزييت
	علبة زيـت الاكـس الخـلفى	
	تـــرب الزيـــت	
	تشحيم مواقـع مركـز الاكـس الامـامى	
	تشحيم نهايات قضيب نقل التوجيه	
	تشحيم نـهايات قضيب التوجيـه	
	تشحـيم البنـوز الرئيسية	
	تشحيم عمود دواسـة الدبريـاج	
	تشحيم وصلات التحكم الهيدروليكى	
	تشحيم نهايات الوصـلة العليـا	
	تشحيم أذرع الرفـــع	
	تشحيم جنازير الفحص	

العلامة	نقـــط الفحـــص	
	مشوار دواسـة الفرامل الحـر	الفرامل × الدبرياج
	ضبط الدواستين اليمين واليسرى	
	دواســتين الفـرامـل	
	فـاعليـة الفـرامـل	
	المشوار الحر لفـرامـل الانتظـار	
	فاعـلية فـرامـل الانتظـار	
	المشوار الحر لدواســة الدبريـاج	
	الوصـل الكـامل للدبريـاج	
	عجـلة القيـادة	جهاز القيادة
	بوش عجـلة القيـادة	
	ثقل عجـلة القيادة عند الدوران	
	أهتزاز عجـلة القيادة عندأدارة المحـرك	
	زيـت الدريكـيون	
	تـــرب الزيـــت	
	زيـت نقـل الحـركـة	نقل الحركة
	تـــرب الزيـــت	
	الاصـوات الغـير عـادية	
	نعومة تغييـر الازرع	
	زيـت الهيدروليـك	الجهاز الهيدروليكى
	تـــرب الزيـــت	
	حـالة حـركة ذراع الرفـــع	
	نعومة (ســهولة) أذرع التحـكم	

العلامة	نقـــط الفحـــص	
	زيـت المحـــرك	المحـــرك
	تـــرب الزيـــت	
	الأصـوات الغـير عـادية	
	غـــاز العـــادم	
	منظـف الهـواء	
	سـير المروحة ،، المروحـة	
	مـستوى مـياه التبريـد	
	الوقـــود	الوقـــود
	فلتر الوقـــود	
	تـــرب الوقـــود	
	الدائرة الكهـربائية	الدائرة الكهربائية
	مـستوى المائع فى البطـارية	
	سـير الدينـامـو	
	حـالة اللمبة الرئيسـية	
	حـالة لمبـة الاشـارات	
	حـالة لمبـة التشـغيل	
	لمبات البيان × العدادات	
	توقف توهج جميع اللمبات عند دوران المحرك	
	بدون ضبط الزيـت × الشحن	
	لمبة ضغط الزيـت × توهج لمبة الشحـن	
	عند دوران المفتاح الرئيـى خطوة واحـده	
	الوضـــع	

Table. 13

PERIODIC CHECKING LIST (After job is over)

RICE TRANSPLANTER

MODEL		DATE	/ /
HOUR METER			
CHICKER		APPROVER	

Checked ✓ | Adjusted △ | Overhauled ○ | Changed Part ×

	Inspection Item	Description	Mark
Engine	Engine oil	Every 300hr.change	
	Engine oil filter		
	Oil leak		
	Engine crank case interior		
	Valve clearance		
	Fuel filter		
	Fuel tank cap		
	Fuel leak		
	Air cleaner		
	Carbureter	Every 600hr.change	
	Spark plug		
	Exhoust pipe & muffler		
	Starting condition of engine		
	Unusual noise		
Steering System	Front alignment	Riding type	
	★Camber		
	★Caster		
	★Toe-in		
	★Kingpin angle		
	Play & ricketiness of steering wheel		
	Stopper bolts		
	Front axle case oil		
	Oil level of power steering		
	Hose damage		
	Driving V-belt of oil pump		
	Oil leak		
Braking System	Free travel of brake pedals	Riding type	
	Clearance between brake pedals & step		
	Parking brake		
	Brake disk or shoe		

	Inspection Item	Description	Mark
Front Drive System	Existence of front axle's damage	Riding type	
	Existence of wheel shaft case's damage & flange's damage		
	Air pressur of tyre	Riding type	
	Existence of tyre's damage		
	Wheel bolts		
	Wheel disk		
	Oil of front axle		
Transmission System	Transmission oil	Every 300hr.change	
	Oil filter		
	Free travel of clutch pedal	Riding type	
	Clutch disk		
	Change levers		
	PTO drive shaft		
	Driving belt		
	Chain case oil		
Electric System	Battery electrolyte level		
	Electrolyte specific gravity		
	Terminal corrosion		
	Alternator		
	Charging		
	Indicator lamps,gauges & meters		
	Electric wire		
Hydraulic system	Hydraulic oil(transmission oil)		
	Oil leak		
	Hydraulic hose		
	Full pressure during relief(kg/cm²)		
	Control Valve		
	Control levers		
	Lift cylinder		
	Lift arms		

	Inspection Item	Description	Mark
Planting System	Planting times		
	Planting Arm		
	Push rod		
	Clearance between the push rod & planting times		
	Ricketiness of push rod		
	Chyncle-belt of seedling feeder		
	Grease or oil of planting arm case		
	Oil of planting chain case		
	Oil of planting case		
	Existance of seedling rack damage		
	Sliding part of vertical feed cam		
	Bearing of vertical feed shaft		
	Sliding part of seedling rack		
	Support roller of seedling rack		
	Existance of float'S DAMAGE		
	Each wire		

Table. 14.

التاريخ		الموديل	
		عدد الساعات	
المرابيع		الفاحص	

قائمة الفحص الدورى (بعد العمل)

لشـــــاحنة الأرز

علامه	الوصف	نقاط الفحص
		ضوافر الشـــــنل
		ذراع الشنل ...
		قضيب الرفع (ذراع الرفع)
		الخلوص بين ذراع الرفع وضوافر الشنل
		مشوار ذراع الرفع
		العمود المترتر (فقدى الشنلات)
		تشحيم أو تزييت علبة ذراع الشنل
		زيت علبة جنزير الشنل
		زيت علبة الشنل
		وجود تآكل فى صدر الشناله
		الانزلاق فى كاسة التغذية الرأسية
		كرسى عمود التغذية الرأسيه
		الانزلاق فى صدر الشناله
		بكر مسند سير الشناله
		وجود تآكل فى العوامات
		كل الأسلاك

جهاز الشنل

علامه	الوصف	نقاط الفحص
	النوع المركوب	وجود تآكل فى الاكس الأمامى
		وجود تآكل فى علبة عامود نقل الحركه
		ضغط الهواء فى الاطار
	النوع المركوب	وجود تآكل فى الاطارات
		مسامير الاطارات
		قرص الاطارات
		زيت الاكس الأمامى
	غير كل ٣٠٠ ساعة	زيت نقل الحركة
		مرشح الزيت
		المشوار الحر لدواسة الكبرياج
	النوع المركوب	قرص الكبرياج
		أذرع نقل الحركة
		عمود الاداره الخلفى
		سير الاداره
		زيت علبة الجنزير
		مستوى السائل فى البطاريه
		الوزن النوعى للسائل
		ألواح البطاريه
		المولد الكهربائى
		الشحن
		لمبات البيان (العدادات)
		السلوك الكهربائيه
		زيت الهيدروليك
		مشرب الزيت
		خراطيم الهيدروليك
		الضغط الكامل للزيت خلال الرجوع كجم/سم٢
		ص صام التحكم (صمام التحكم)
		أذرع التحكم
		اسطوانة الرفع
		أذرع الرفع

جهاز التغذية الأساسى

جهاز نقل الحركة

الجهاز الكهربائى

الجهاز الهيدروليكى

علامه	الوصف	نقاط الفحص
	غير كل ٢٠٠ ساعة	زيت المحرك
		فلتر زيت المحرك
		مشرب الزيت
		علبة مرفق المحرك
		خلوص المسام
		فلتر الوقود
		غطاء تنك الوقود
		مشرب الوقود
		منظف الهواء
	غير كل ٤٠٠ ساعة	المغذى (الكاربراتير)
		شمعة الاحتراق (البوجية)
		الشكمان
		حالة بدء ادارة المحرك
		الصوت الغير عادى
		الانحراف الأمامى
		زاوية الكامبر
		زاوية الكاستر
		رولمان بلى الدريكسيون
	الشناله	زاوية البنز الرشيى
	المركوبة	المشوار الحر للدريكسيون
		مسامير التثبيت
		زيت علبة الاكس الامامى
		مستوى الزيت فى علبة زيت الدريكسيون
		تآكل الخراطيم
		سير طلمبة الزيت
		مشرب الزيت
		المشوار الحر لدواسى الفرامل
	الشناله	الخلوص بين دواسى الفرامل والخطوه
	المركوبة	فرامل الانتظار
		تيل أو قرص الفرامل

المحرك

جهاز القيادة

الفرامل

تغيير جزء	X	عمره كامله	○	فحص	✓
فحص	✓	فحص	△		

Table. 16.

قائمة الفحص لموسم التشغيل الاولى

لشتالة الارز

التاريخ		الموديل	
		عددالساعات	
المراجع		الفاحص	

فحص	✓	ضبط	△	عمره كامله	○	غير الجزء	×

العلامة	نقـــــاط الفحـــص	
	فـــوافر الشـــتل	جهاز الشتل
	ذراع الدفع	
	تشحيم أو تزييت علبة الضوافر	
	الخلوص بين مسمار الدفع	
	تشحيم أو تزييت علبة ذراع الدفع	
	زيت علبة جنزير الشحم	
	زيت علبة الشتل	
	انزلاق صدر الشتاله	
	كل وصلة	التزييت
	محور كامة دبرياج الشتل	
	وصلة دبرياج القيادة	
	محور وصلة اسطوانة الهيدروليك	
	سلك دبرياج الشتل	
	محور ذراع دبرياج القيادة	
	سلك دبرياج القيادة	
	محور عمق الشتل	
	ذراع الضبط	
	سوستة دبرياج التغذية	

العلامه	نقـــــاط الفحـــص	
	المشوار الحر لدواستى الفرامل	الفرامل
	فعالية الفرامل	
	فعالية فرامل الانتظار	
	زيت نقل الحركة	نقل الحركة
	المشوارالحر لدواسة الدبرياج	
	الأذرع	
	سير الادارة	
	زيت علبة الجنزير	
	مستوى السائل فى البطارية	الجهاز الكهربائى
	الوزن النوعى للسائل	
	ألواح البطارية	
	لمبات البيان والعدادات	
	مستوى زيت الهيدروليك	الجهاز الهيدروليكى
	تسرب الزيت	
	حالة حركة ذراع الرفع	
	نعومة أذرع التحكم	

العلامه	نقـــــاط الفحـــص	
	زيت المحرك	المحرك
	تسرب الزيت	
	منظف الهواء	
	الشكمان	
	الصوت الغير عادى	
	الوقود	الوقود
	مرشح الوقود	
	تسرب الوقود	
	المشوار الحر للدريكسيون	جهاز القيادة
	مدى ثقل عجلة القيادة	
	الدوران	
	مدى اهتزاز عجلة القيادة	
	السرعة	
	زيت الدريكسيون	
	تسرب الزيت	

Table. 17.

PERIODIC CHECKING LIST (after job is over)
COMBINE

MODEL		DATE	/ /
HOUR METER			
CHECKER		APPROVER	

Checked: v | Adjusted: △ | Overhauled: ○ | Changed Part: ×

Inspection Item	Mark
Reaping Mechanism	
Engine	
Engine crank case interior	
Fuel injection nozzle	
Valve clearance	
Water separator	
Air intake system	
Battery electrolyte level	
Battery electrolyte, checking specific gravity & charging	
Engine oil	
Engine oil filter	
Fan belt	
Fin blade & Radiator core	
Trimming	
Clearance between the Reaping and Receiving Knives	
Stroke	
Spring lug from the bottom of the knife head	
Resistance by the Cutter Knife Guide	
Clearance between the ground surface and the top of the Cutter Knife	
Link ball lock nut tightening torque (kg/cm)	
Raising	
Forward movement of the left side of the center left one	
Space in the lower part of the raising case	
Difference in the Sprocket rotation direction (outer circumference)	
Raising Chain tension	
Raising Case lid opening space	
Screening	
Rotation of the Screening Wheel	
Vertical deviation of the Screening Wheel	
Tension of the belt with the direction (distortion in the center of the belt when pressed with a 3 kg force)	
Lower Conveyer	
Clearance between the Chain Roller and the Lower Conveyer Guide	
Clearance between Conveyer Sprocket 18 and the Scraper	
Clearance between the Right Tension Spring and the hook on the Lower Conveyer	
Length of the compressed spring at the left side of the Lower Conveyer	
Clearance between the upper/lower portions of the Chain and Auxiliary Guide Rod	
Clearance between the upper/lower portions of the Chain and Lower Conveyer	
Clearance between Conveyer Sprocket 18 and the front/rear portion of the Scraper	
Clearance between the upper part of the Lower Relief Rod and the upper/lower portions of the Chain	
Clearance between the lower portion of the Lower Relief Rod and the upper/lower portions of the Chain	
Clearance between the upper part of the Lower Relief Plate and the upper/lower portions of the Chain	
Clearance between the lower part of the Lower Relief Plate and the upper/lower portions of the Chain	
Upper Conveyer	
Clearance between the Upper Right Tine and the Center Guide	
Clearance between the Upper Left Tine and the Center Guide	
Vertical Conveyer	
Guide position on the Chain	
Clearance between the Chain Roller and Guide (vertical and horizontal)	
Clearance between the Chain and the Chain Cover	
Clearance between the Chain and the upper/lower arch of the Tangle Prevention Rod	

Inspection Item	Mark
Reaping Mechanism	
Reaping Mechanism	
Minimum clearance between the Lower Conveyer Chain and the Guide (when processing corn of the shortest height)	
Chain tension	
Gap between the Tension Roller Bearings	
Clearance between the Vertical Conveyer Chain and the Feed Chain (when processing corn of the shortest (height) horizontal)	
Clearance between the Vertical Conveyer Chain and the Feed Chain (when processing corn of the shortest (height) horizontal)	
Threshing Mechanism	
Threshing Drum bolt tightening torque (kg) (lbf)	
Threshing Drum balance (g) (oz)	
Threshing Drum Inlet clearance	
Threshing Drum Outlet clearance	
Threshing Teeth wear	
Threshing Teeth tightening torque (kg) (lbf)	
Tilt of the Threshing Teeth	
Clearance between the Cutting Blade and the Threshing Teeth	
Cutting Blade tightening torque (kg) (lbf)	
Crimp Net Cutting Blade and the Threshing	
Clearance between the Threshing Teeth and the Grimp Net	
Clearance between the Threshing Teeth and the Net Holder	
Feed Chain Tension Spring length	
Clearance between the Straw Holder Plate and the Chain Rollers	
Clearance between the Net Holder and the Straw Holder Plate	
Straw Holding Rate position (room for the long hole)	
Overlap between the Feed Chain and the Inlet Straw Guide Rod	
Clearance between the Feed Chain and the Inlet Straw Guide Rod	
Projection of the Inlet Guide Rod from the Inlet Iron Plate	
Sorting	
Clearance (min.) between the Winnower Fan tip and the Wind Drum	
Min. Clearance between the side surfaces of Winnower Fan and the Side Board	
Winnower fan balance (g · cm)	
Precision of the metal fixing surface right angle	
Outer circle precision of the Winnower Fan	
Clearance between the 2nd Thrower and the Bottom Plate	
Clearance between the 2nd Thrower Fan side surface and the casing	
Clearance between the 2nd Conveyer and the Conveyer Tub	
Clearance between the Suction Fan and the rear panel of the Fan	
Clearance between the Suction Fan and the outer circle of the casing	
Clearance between the Suction Fan and the Fan Guide Plate	
Clearance between the Upper Grain Lift Conveyer Fan and the Conveyer	
Clearance between the 1st Conveyer Tub and the outer circumference of the spiral	
Clearance between the Shutter Guide Rubber and the Shutter	
Husk Sensor switch ON load (g)	
Husk Sensor switch OFF load (g)	
Shaking Plate horizontal swing	

Inspection Item	Mark
Threshing Mechanism	
Sorting	
Internal width of the Shaking Plate	
Clearance between the shaking Plate and lower part of the Combine	
Chaff Sieve angle (up-bending) (°)	
Chaff Adjustment Arm	
Parallel degree of the Shaking Shaft and the Shaking Arm	
Length of the Shaking Balance Spring	
Feeding	
Distortion in the direction of the Track Roller Shaft	
Height of the Drive Sprocket Teeth	
Distortion in the direction of the Drive Sprocket rotation	
Hydraulic down amount of the Crawler between the 3rd and 4th wheels of the lower part of the Crawler	
Transmission	
Cross joint	
Rubber Boot	
Slide Shaft B and Spline A	
Backlash (Input Shaft outer circumference)	
Transmission Fork slit wear (ineffective load) (kg)	
Wear of the Shift Fork tip (gap between the Fork and Fork Shaft)	
Wear of the Fork Shaft Slot (ineffective load) (kg)	
O-ring	
Gear Backlash	
Idle in the direction of the Shaft rotation	
Shaft bending	
Clearance between the Speed-Changer Fork and Fork slot in the gear	
Ineffective load of the Speed Changer Fork	
Tightening of the Oil Seal	
Power Shift	
Power shift pressure (kg/cm²)	
Second relief pressure (kg/cm²)	
Oil temperature (°C)	
Pump rotation number (rpm)	
Engine rotation (Rated) (rpm)	
Hydraulic Pump output (ℓ/min)	
Power Transmission	
Pulley Revolution ratio	
Belt Clutch IN	
Belt Clutch OFF	
Oil leakage	
Tension Arm Swing	
V belt tension	
Distance between the belt Holder and the belt when the Clutch is IN	
Frame	
Distortion of the Input Shaft Spline	
Wear of the Cross joint	
Torque for securing the Main Frame and the Track Frame	

Inspection Item	Mark
Driving Mechanism	
Operation Handle	
Idling of the Lower Clutch Lever	
Idling of the Side Clutch Lever	
Idling of the Reaping Clutch (Right) Lever	
Idling of the Reaping Clutch (Lower) Lever	
Idling of the Threshing Clutch Lever	
Clearance between the Sub Speed-Change Lever and latch rear of the Lever Guide	
Length of the Parking Brake adjustment screw	
Hydraulic Unit	
Pump capacity (ℓ/rev)	
Full pressure during relief (kg/cm²)	
Reaper elevating time (sec.)	up: / down:
Threshing depth adjustment (mm)	Front: (standard) / (range) / Rear: (standard) / (range)

Lubrication, Water Supply, and Lubricant

Parts	Mark	Parts	Mark
Engine tension bolt			
Engine (water)		Cutting Blade Crank Lever	
Counter Case		Lower Tension Arm	
Hydraulic Tank		Bottom of the Lower Metal Rod	
Transmission		Auxiliary Guide Rod	
Transmission Shaft		Vertical Support Arm	
Drive shaft B		Vertical Support Base	
Cylinder collar of Hydraulic Cylinder		Vertical Conveyer Guide Pivot	
Hydraulic Lever		Cutting Blade	
Tension Arms		Lower Chain Case (Left)	
Idler		Upper Chain Case (Right)	
Idler metal shaft		Inner Interception Conveyer Chain tension	
Tension bolt 12 x 145		Inner Case	
Sub Speed-Changer link ball		Chain Shaft Case	
Track roller		Grain Lift Conveyer Case	
Rotary pivot metal		Cutter Tension Arm	
Pedal		Chaff Bevel Case	
Main Speed-Changer Lever		Tension Arm 132	
Sub Speed-Change Lever		Tension Arm 150	
Parking Brake Arm		Tension Arm 150 Upper	
Clutch Levers		Tension Arm 150 Lower	
Reaping Bevel Gear Case (Right Side of the Reaping 3 Shaft Case)		Tension Arm 215	
Left Side of the Reaping 3 Shaft Case		Cutter Case	
Reaping 5 Shaft Case (L.R)		Straw Discharge Guide Rod	
Reaping Bevel Case (Left)		Threshing Drum Cover	
Reaping Bevel Case (Right)		Spring Tension Arm	
Upper External Drum (Right)		Suction Driven Case	
Upper Right Bevel Case		Straw Discharge Scraper 10	
Vertical Rotating Case		Drive Sprocket B	
Vertical Conveyer Bevel Case		Rotary Frame Pivot (L/R)	
		Cover Hook (L/R)	

Table. 18.

فـــــــائـــــــة

الفحص الدوري للكومـــــــــــــاين

التاريخ		الموديل	
		عداد الفياس	
المراجع		القياجي	

نغير الجزء	✕	اصلاح شامل "العمرة"	○	ضبط	△	فحص	✓

الجهاز	الجزء	بيان الوصف	العلامة
جهاز القيادة	نابض التنقل	الانخفاض في دواسة دبرياج العوامل	
		الانخفاض في ذراع الدبرياج الجانبي	
		الانخفاض في ذراع دبرياج الحصاد العلوي	
		الانخفاض في ذراع دبرياج الحصاد السفلي	
		الانخفاض في ذراع دبرياج الدراس	
		الخلوص بين ذراع تغيير السرعة وكل ساعات التوال	
		طول فلاوولا ضبط فيراميل الانيكار	
وحدة الهيدروليك		سعة الطلمبة (سم³/لفة)	
		الضغط الكامل خلال الرجوع كجم/سم²	
		وقت رفع الحصاد (فوق-تحت)	
		من الاقل للاعمق وقت ضبط عمق الدراس	
		من الاعمق للاقل وقت ضبط عمق الدراس	

الجهاز	الأجزاء		الجهاز	التزييت وامداد الشحم	
جهاز القيادة	زيت المحرك		جهاز الحصاد	ذراع مرفق سلاح القطع	
	مياه المحرك			ذراع الشد السفلي	
	علبة الكاونتر			قاع قضيب الراجم الس	
	تنك الهيدروليك			قضيب الواقي الاحتياط	
	نقل الحركة			ذراع الارتكاز الرأسي	
	عمود نقل الحركة			قاعدة الارتكاز الرأسي	
	عمود القيادة			محور واقي الناقل الرأسي	
	اسطوانة الهيدروليك			سلاح القطع	
	ذراع الهيدروليك			علبة الجزء السفلي شمال	
	اذرع الشد			علبة الجنزير السفلي	
	السرعة المطشه			شد جنزير الناقل الافقي	
	العمود المعدني			علبة نقل القدرة	
	مسمار الشد ١٢×١٤٥		جهاز الدراس	علبة عمود الجنزير	
	وصلة تغيير السرعة المساعد			علبة ناقل الحبوب	
	بكر الجنزير			ذراع شد القاطع	
	مسحدن الدوران المحوري			علبة التروس المخروطية	
	الدواسة			ذراع الشد ١٣٠	
	ذراع تغيير السرعة الرئيسي			ذراع الشد ١٥٠	
	ذراع تغيير السرعة المساعد			ذراع الشد ١٨٠ علوي	
	ذراع فرامل الانعطاف			ذراع الشد ١٥٠ سفلي	
	اذرع الدبرياج			ذراع الشد ٢١٥	
جهاز الحصاد	علبة تروس الحصاد والجانب الايمن لعمود الحصاد			ترس القاطع	
	الجانب الايسر لعلبة عمود			قضيب واقي تعرية القش	
	علبة العمود الايسر من الحصاد			نقطة درفيل الدراس	
	علبة التروس المخروطية			ذراع شد الهزاز	
	علبة التروس المخروطية			علبة مبادل السحب	
	الدرفيل الخارجي العلوي			مجلة تعرية القش	
	علبة المخروطي العلوي			مجلة سلسلة ٨	
	علبة الدوران الرأسي			محور الاطار الدوار	
	علبة المخروطي الناقل			نقطة الغطاء اشمال ✓	

الجهاز	الجزء	بيان الوصف	العلامة
جهاز الدراس	الشسيل	العرض الداخلي للوحة الهز	
		الخلوص بين لوحة الهز والجزء السفلي للكومباين	
		زاوية الغرابل	
		ذراع ضبط التبن	
		درجة التوازي لعمود الهز	
		طول سوستة اتزان الهز	
جهاز القيادة	الناقل التبادلي	التحويل في اتجاه عمود بكرة الجنب	
		ارتفاع اسنان عجلة القيادة المشنة	
		التحويل في اتجاه دوران عجلة القيادة	
		مقدار اتزان الكابينة	
	نقل الحركة	بين المحلة الثالثة والرابعة لاقل جزء / الوصلة المتد	
		الجزء المطاطي في الكابينة	
		العمود المنزلق	
		المحيط الخارجي لعمود القدرة	
		تآكل شوكة نقل الحركة	
		تآكل شفة شوكة الرفع	
		تآكل الفتحة الضيقة لعمود الشوكة	
		حلقة على شكل حرف O (أورنج)	
		بوش الترس	
		انخفاض الاتجاه في دوران العمود	
		انحناء العمود	
		الخلوص بين شوكة تغيير السرعة وفتحة الشوكة في	
		الحمل الغير فعال في شوكة تغيير السرعة	
		ربط الاوسل	
	عمود القدرة	ضغط عمود القدرة كجم / سم²	
		ضغط الراجم الثاني كجم / سم²	
		درجة حرارة الزيت °م	
		عدد لفات دوران الطلمبة (لفة / دقيقة)	
		عدد لفات الموتور (لفة / دقيقة)	
		تصرف طلمبة الهيدروليك	
	نقل القدرة	حدود اختلاف الطارة	
		دبرياج السير في وضع الفتح	
		دبرياج السير في وضع الغلق	
		تسرب الزيت	
		تأرجح ذراع الشد	
		شد السير حرف	
		الخلوص بين مانع السير عندما يكون الدبرياج في	
		الاطار	
		التحويل في دوران عمود القدرة	
		التآكل في الوصلة المطاطية	
		عزم الاطار الرئيسي واطار الحبه	

الجهاز	الجزء	بيان الوصف	العلامة
جهاز الحصاد	الناقل العلوي	أقل خلوص بين جنزير النقل السفلي والواقي	
		شد الجنزير	
		ضبط كراسي بكر الشد	
		الخلوص بين جنزير النقل الرأسي وجنزير التغذية أقل	
		الخلوص بين النقل الرأسي وجنزير التغذية (اقصر وضع)	
		عزم ربط مسامير ورفيل الدراس	
جهاز الدراس	درفيل الدراس	اتزان درفيل الدراس	
		الخلوص الداخلي لدرفيل الدراس	
		الخلوص الخارجي لدرفيل الدراس	
		تآكل اسنان الدرفيل	
		عزم ربط اسنان الدرفيل	
		اتزان اسنان الدرفيل	
		الخلوص بين سكينة القطع واسنان الدراس	
		عزم ربط سكينة القطع	
		الشبكة اسفل الدرفيل وكذا سكينة القطع	
		الخلوص بين الدرفيل والصدر	
		الخلوص بين اسنان الدرفيل وماسك الشبكة	
		طول سوستة شد جنزير التغذية	
		الخلوص بين ماسك القش وبكرة الجنزير	
		الخلوص بين ماسك الشبكة وماسك القش	
		وضع ماسك القش	
		التداخل بين جنزير التغذية وواقي جنزير القش الداخلي	
		الخلوص بين جنزير التغذية وقضيب واقي القش	
		التلامس في القضيب الداخلي من اللوحة المدعمة	
		الخلوص بين قمة مروحة التذرية ودرفيل الرياح	
	التذرية ونقل الحبوب	الخلوص بين السطح الجانبي لمروحة التذرية واللوحة	
		اتزان مروحة التذرية	
		الزاوية اليمنى للسطح المعدني	
		الدائرة الخارجية لمروحة الهواء	
		الخلوص بين المروحة الثانية واللوحة السفلية	
		الخلوص بين السطح الجانبي للمروحة الثانية والسطح	
		الخلوص بين الناقل الثاني وانبوبة الناكل	
		الخلوص بين مروحة السحب والغطاء الخلفي للمروحة	
		الخلوص بين مروحة السحب والغلاف الخارجي	
		الخلوص بين مروحة السحب وواقي المروحة	
		الخلوص بين مروحة تآكل الحبوب والناقل	
		الخلوص بين انبوبة الناقل الاول والمحيط الخارجي	
		الخلوص بين جلدة واقي الدرفيل والدرفيل	
		مفتاح حساس الحمل في وضع الفتح	
		مفتاح حساس الحمل في وضع الغلق	
		لوحة الهزاز الافقي	

الجهاز	الجزء	بيان الوصف	العلامة
جهاز الحصاد	المحرك	علبة مرفق المحرك	
		شاشات حقن الوقود	
		خلوص الصمامات	
		عازل المياه	
		نظام سحب الهواء	
		مستوى المائع بالبطارية	
		المائع بالبطارية / فحص الكثافة النوعية / الشحن	
		زيت المحرك	
		فلتر زيت المحرك	
		سير المروحة	
		ريشة المروحة / قلب الردياتير	
	الحصاد	الخلوص بين سكينة الحصاد	
		طول المشوار	
		رولمان بلي قاعدة سكينة الحصاد	
		المقاومة بواسطة حوافظ سكينة الحصاد	
		الخلوص بين سطح الأرض وقمة سكينة القطع	
		عزم ربط صامولة الوصلات كجم - سم	
	الترس	الحركة الامامية للجانب الايسر من مركز السلاح	
		الفراغ في الجزء السفلي من علبة الرفع	
		الاختلاف بين المواقع الامامية والخلفية من علبة الرفع	
		شد جنزير الرفع	
		الاختلاف في اتجاه دوران المحلة المسننة المحيط الخارجي	
		الفراغ المفتوح لعلبة الرفع	
	التلقيم	دوران عجلة التلقيم	
		شد السير مع التلامس (الكموفود)	
		الخلوص بين بكرة الجنزير وواقي الناكل السفلي	
	الناقل السفلي	الخلوص بين عجلة الرفع والتلقيم	
		الخلوص بين سوستة الشد المصن وماسك الناكل السفلي	
		طول سوستة الضغط في الجانب الايسر من الناكل السفلي	
		الخلوص بين المواقع العليا والسفلى للجنزير لقضيب	
		الخلوص بين المواقع العليا والسفلى للجنزير والناكل	
		الخلوص بين عجلة النقل والمواقع الامامية والخلفية	
		الخلوص بين الجزء السفلي من قضيب المواقع السفلي	
		الخلوص بين الجزء العلوي للوحة الراجع السفلية	
		الخلوص بين الجزء السفلي للوحة الراجع السفلية	
		الخلوص بين السلاح الايسر العلوي وواقي المنحنى	
		الخلوص بين السلاح الايسر العلوي وواقي المنحنى	
	الناقل العلوي	وضع الواقي على الجنزير	
		الخلوص بين بكرة الجنزير والواقي (الغير رأسي)	
		الخلوص بين الجنزير وغطاء الجنزير	
	الناقل الرأسي	الخلوص بين بكرة الجنزير والواقي	
		الخلوص بين الجنزير وغطاء الجنزير	
		الخلوص بين الجنزير والنهاية العليا لقضيب الشد	

Table. 19

CHECK LIST FOR PRE-SEASONAL OPERATION
COMBINE

MODEL		DATE	/ /
HOUR METER			
CHECKER		APPROVER	

Checked ∨ | Adjusted △ | Overhauled ○ | Changed Part ×

	Point to check	Mark
Oil & Warter	Engine oil	
	Transmission oil	
	Inlet case oil for threshing	
	Reaping inlet case oil	
	Oil pressure	
	Lubricating filter oil	
	Central lubricating tank's oil	
	Cooling water	
Fuel	Fuel quantity	
	Fuel filter	
	Fuel tank cap	
	Fuel leak	
Brake		
	Brake free travel	
	Parking brake	
Clutch	Side clutch	
	Parking clutch	
	Thresing clutch	
	Reaping section up/down	
	Travelling clutch pedal	

	Point to check	Mark
Chain & Belt	Raising chain	
	Upper conveyer chain(right, left)	
	Lower conveyer chain(right, left)	
	Vertical conveyer	
	Feed chain	
	Stalk dichange chain	
	Raking belt	
	Counter belt	
	Cooling fan belt	
	Travel driving belt	
	Reaping counter belt	
	Reap driving belt	
	Threshing cylinder belt	
	Separation driving belt	
	Rocking drive belt	
	Hydraulic drive belt	
Others	Air cleaner element	
	Threshing knife	
	Clearance between reaping knives	
	Side clutch lever	
	Reaping clutch lever	
	Crawler	
	Threshing teeth	

	Point to check	Mark
Bolt	Set bolt of threshing cylinder	
	Each pully set bolt	
	2nd thrower bolt	
Electric System	Recharging	
	Sensors	
	Checkers	
	Battery electrolyte level	
	Electrolyte specific gravity	
	Terminal corrosion	
Lubrication	Raising chain	
	Cutting knife	
	Lower conveyer chain	
	Upper conveyer chain	
	Vertical conveyer chain	
	Each wire	
	Feed chain	
	Stalk holder spring	
	Stalk discharge chain	

Table. 20.

التاريخ		الموديل	
		عدد الساعات	
المراجع		الفاحص	

قائمة التشغيل السنوى المبدئى للكومباين

(١) (٢) (٣)

أفحص	✓	اضبط	△	اصلاح شامل بالعمرة	○	غير الجزء	×

العلاقة	نقاط الفحص	العلاقة	نقاط الفحص	العلامة	نقاط الفحص	
	جنزير الرفع	التروس	سير مروحة التبريد		زيت المحرك	الزيت والمياه
	سكينة القطع		سير تشغيل السرعة الأمامية		زيت نقل الحركه	
	جنزير الرفع السفلى		سير طارة الحصاد		علبة الزيت الداخلية للدراس	
	جنزير الرفع العلوى		سير تشغيل الحصاد		علبة الزيت الداخلية للحصاد	
	جنزير الرفع الرأسى		سير أسطوانة الدرفيل		زيت تنك ضبط الزيت	
	كبلر سلك		سير فصل الحركة		زيت فلتر للتزييت	
	جنزير التغذية		سير الفراط		زيت تنك التزييت المركزى	
	سلاى عايك القش		سير تشغيل السعود والساد		مياة التبريد	
	جنزير تعريف القش	أشياء أخرى	سكينة الدراس		الوقود	الوقود
			الخلوص بين سكاكين الحصاد		فلتر الوقود	
			ذراع الكباس الخانس		تنك الوقود	
			ذراع كباس الحصاد		تسرب الوقود	
			الكاتينة الكاوتش		الفرامل	الفرامل
			أسنان الدرفيل		فرامل الانتظار	
			مسامير أسطوانة الدراس		الكباس الخانس	الكباس
			مسامير كل طارة		كباس الانتظار	
		مسامير	مسامير البربمة الثانية		كباس الدراس	
			البطارية		رفع وخفض حياز الحصاد	
		الكهرباء	اعادة الشحن		دواسة كباس السرعة الأمامية	
			الأعايم الحساسة		جنزير الرفع العلوى (يمين - شمال)	الجنازير والسور
			الفاحصون		جنازير الرفع السفلى (يمين - شمال)	
					الناقل الرأسى	
					جنزير التغذية	
					جنزير تعريف القش	
					سير البريمات	
					سير طارة نقل الحركة الرئيسية	

Table.21. Two output examples of parts control by computer

```
**************************
*  PARTS  LIST  *
**************************

  PART CODE    PART NAME
121850-55700  STRAINER fuel

PRICE  Q'TY   AMOUNT          DATE OF   Q'TY  TOTAL  Q'TY  TOTAL  Q'TY
       OF     OF     MIN MAX GETTING   OF    OF     OF    OF     OF
(YEN)  STOCK  STOCK           SHIPPING  GET.  GET.   SHIP  SHIP   ORDER

 1098     7     7686    5  15
 1098     2     2196          12.12.89                    5      5      3

 PLEASE SELECT THE OPERATION
OUTPUT OF PARTS LIST              =1    ADDITION OF NEW PARTS =  2
GETTING OR SHIPPING OF THE PART =3    END OF OPERATION      =999
KEY IN THE OPERATION NUMBER?
```

Notes: 1) 「AMOUNT OF STOCK」= Shows 「PRICE」×「Q'TY OF STOCK」. The number is caluculated automatically.

2) 「Q'TY OF STOCK」= Shows the present quantity of stock. The number of after second is caluculated automatically when input the getting or shipping number.

3) 「TOTAL OF GET」= Shows the total quantity of received part. The number is caluculated automatically.

4) 「TOTAL OF SHIP」= Shows the total quantity of shipped part. The number is caluculated automatically.

5) 「Q'TY OF ORDER」= Shows the quantity of part needed. This colum is shown when stock quantity drops below the necessary minimum quantity of stock. The number is shown 「MIN」×「Q'TY OF STOCK」 and this is caluculated automatically.

```
**************************
*  PARTS  LIST  *
**************************

  PART CODE    PART NAME
194420-52120  SWITCH head light

PRICE  Q'TY   AMOUNT          DATE OF   Q'TY  TOTAL  Q'TY  TOTAL  Q'TY
       OF     OF     MIN MAX GETTING   OF    OF     OF    OF     OF
(YEN)  STOCK  STOCK           SHIPPING  GET.  GET.   SHIP  SHIP   ORDER

 3068     1     3068    2  10
 3068     2     6136          25.12.89     1      1

 PLEASE SELECT THE OPERATION
OUTPUT OF PARTS LIST              =1    ADDITION OF NEW PARTS =  2
GETTING OR SHIPPING OF THE PART =3    END OF OPERATION      =999
KEY IN THE OPERATION NUMBER?
```

→ This colum is indication sentences. The indication sentences are shown when a operator operated for print「MENU」that is a first operation, and「Parts List」on the TV screen.

Table.22. Machines of Which Parts Can be Purchased in Egypt

****

Maker	Machines Classification	Model	Supplier	Remarks
Kubota	Tractor	B7100DT	DELTEX CO. ATT: Dr.Adawy 50, Mousaddak St.Dokki Cairo Tel. 02-348-3602-3605	
		L295		Partial parts
		L3001DT		"
		M4500DT		"
		M7500DT		"
	Combine	RX2100	EGYPTIAN DISTRIBUTION CO.	"
	Reaper	AR120	(EDC) ATT: Mr.Abdel Hamid Abu-Samura. 217 Gomhouria St. Mansoura Tel. 050-324-455, 321-975	
Yanmar	Combine	TC2200KE	EGYPTIAN COMPANY FOR AGRICULTURAL DEVELOPMENT (ECAD) ATT:Mr.Amr Hefny.President Tel. 02-362-0118	
Iseki	Combine	HL2500	SHUKRY CO. ATT: Mr. Sabry El-Shamly Nosra, Kafr El-Sheikh Tel. 047-23-2724	Partial parts

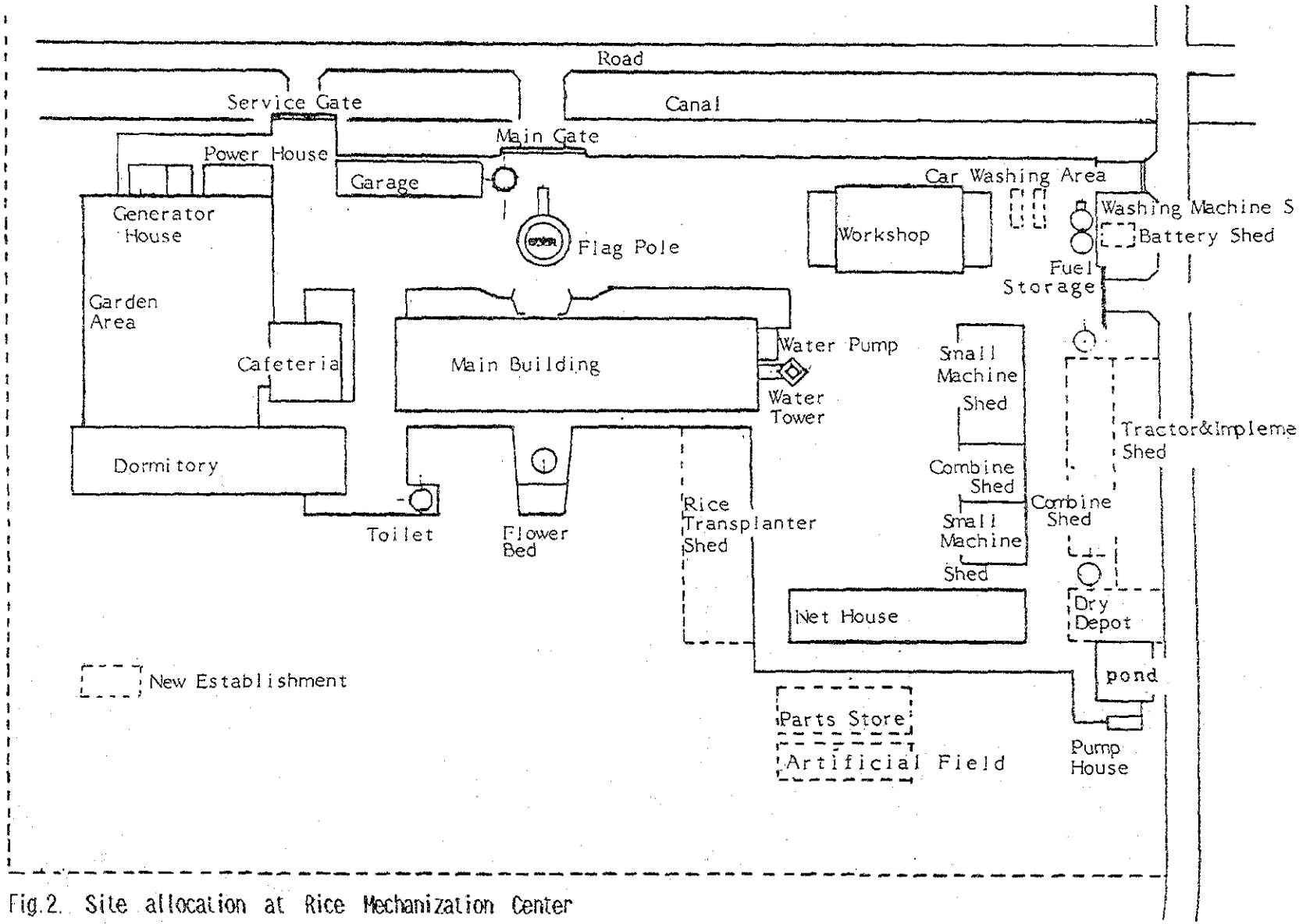


Fig.2. Site allocation at Rice Mechanization Center

Fig. 3 Tractor & IMOLEMENT SHED

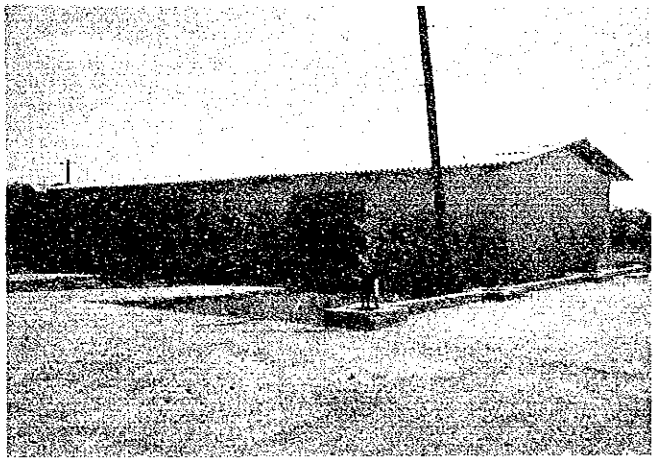


Fig. 6 PARTS STORE

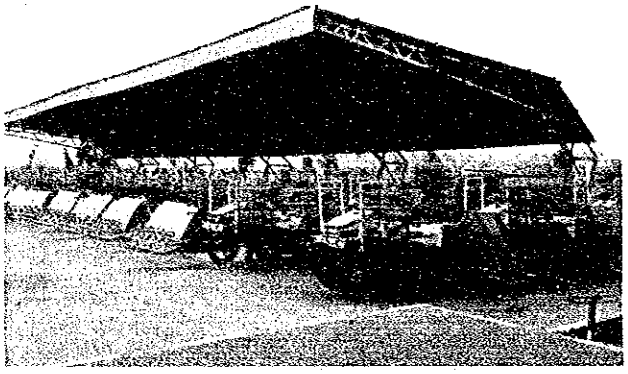


Fig. 4 TRANSPLANTER SHED

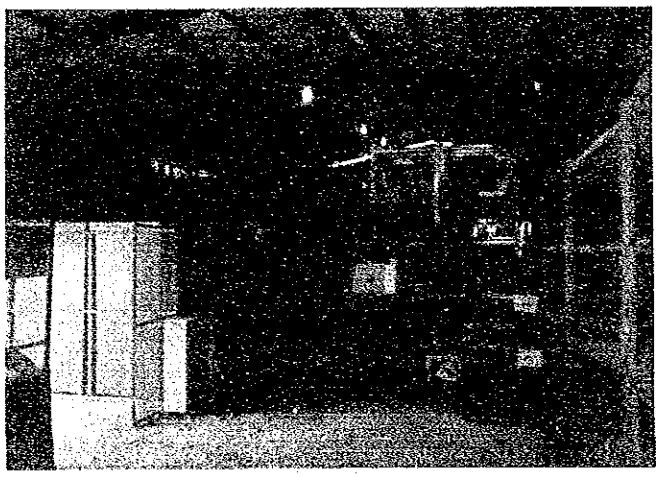


Fig. 7 THE INSIDE STORE

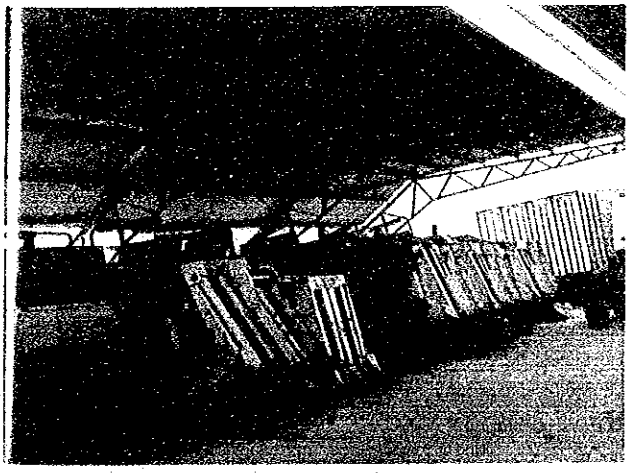


Fig. 5 COMBINE SHED

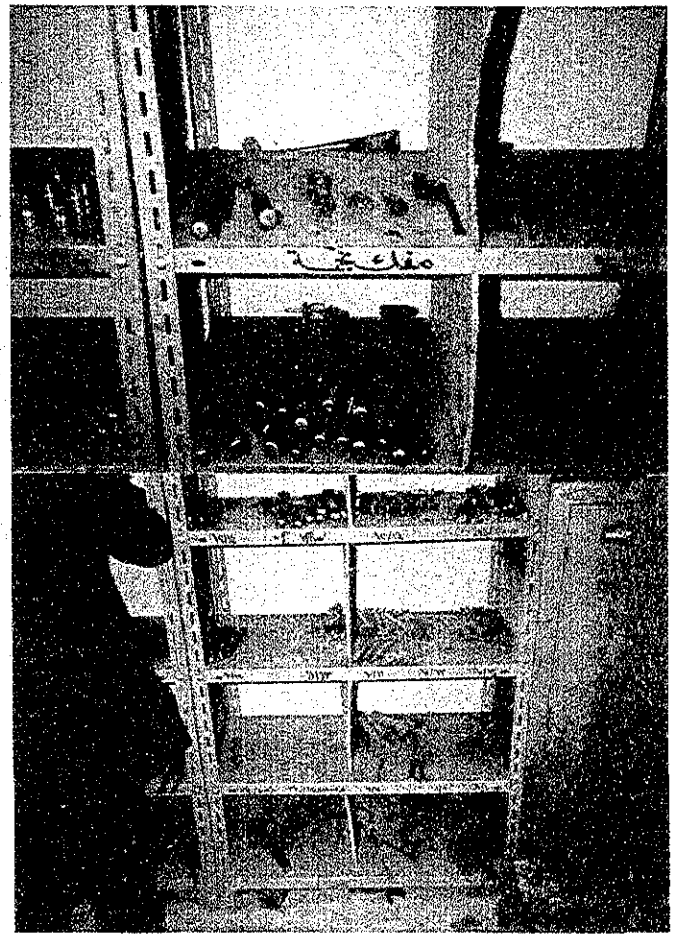


Fig. 8 Situation of tool storage and maintenance.

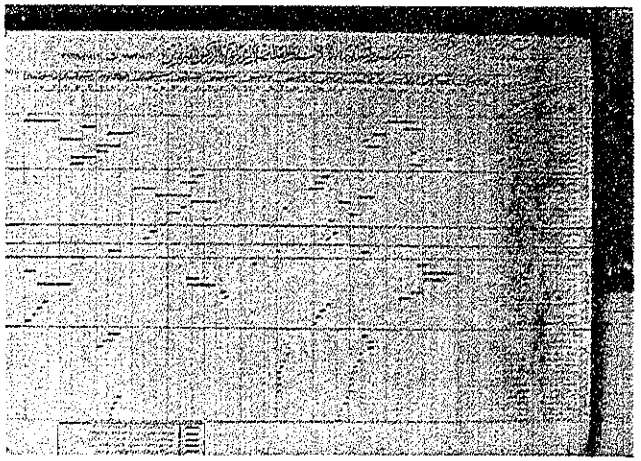


Fig. 9 Agriculture machine inspection and repair schedele of 1990 Year in with Arabic, which is put up in the Vica manager's room. The room is next to the workshop

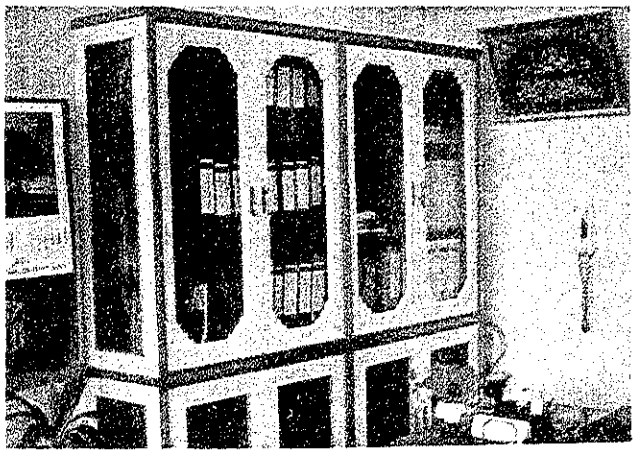


Fig. 10 New cabinet for keeping technical serv ice materials the cabinet is the manag er's room.

V Advice and guidance of the demonstration of mechanized rice farming :

1 Demonstration at RMC

(1) Objectives and targets.

This part of the activities is to exhibit a technical package of the exemplary mechanized transplanting rice cultivation system as practiced on an authentically practical scale using the RMC fields and facilities with all the infrastructurel, irrigation and roads, prepared as it should be. The technical package was derived by modifying and improving the system already established through the verification trials in the preceding phase of the project.

The actual target yield was set at 2.8-3.0 tons per feddan as the average value obtained from different patches of mostly low fertility paddies reclaimed from saline marshy pieces of land.

The yield-records from the same fields in the previous growing season stood at 2.2 to 2.7 tons per feddan at most.

Points of improvement were sought in the following aspects of the entire system.

1) Improvement in the land preparation operations incluing more elaborate plowing, harowing, and levelling proce dures aimed at effective levelling and weeding.

2) Establishment of a more densely populated crop communty by increasing the number of plants per unit area,which is to be effected by a machinery adjustment to portion out larger seedlings-blocks from the nursery mat, and also by increasing the frequency of picking -and-planting strockes resulting in narrower hill spaces along the rows.

3) An increase in fertilizer dosage to faciliate more vigorous growth for IR-28.

4) Improvement of harvesting operations for the purpose of expediting the early sowing of Egyptian clover (which induces a bumper crop).

(2) Demonstration of the mechanical transplanting system.

1) Summary of yield records :

(i) Yield record in 1987: A total paddy rice yield of 172.284 tons/56.08 feddans (Average 3.072 tons/fed dan) was recorded by harvesting with a Head-feeding combine for all of the production fields.

This increased yield in the 1987 season is equal to 121% of the yield record in the 1986 season. For varietal break down, 118% in IR-28 and 123% in Giza-171 respectively.

In this regards, refer to Table 1.

Table-1. Yield Records in 1987 Season

Variety Used	Name of Block	Total area of each Block ①	No. of plot in each Block	Total yield in each Block ②	Average yield ③ (③=②÷①)	Average yield ④ (④=③× 100/42)	Ratio of 1987 record / 1986 record	Achievement score to the target
		f.	plots	tons	ton/f.	ton/h.	%	
IR-28	B	18.71	23	69.609	3.720	8.854	118	102.4%
	C	20.62	23	51.782	2.511 (3.185)	5.976 (7.590)		
	D	8.96	12	29.893	3.336	7.940		
Giza 171	A	7.79	8	21.000	2.695	6.414	123	
Grand total		56.08	66	172.284	3.072	7.311		

(Notes)

(i) Grain moisture content was 19% approximately at harvesting.

(ii) Field map was attached into Appendix-I.

However, a variation of yields among plots in each block has been observed. The results of a yield-survey showed that as a whole there was some tendency of yield decrease in parallel to the distance of the irrigation branch canal from the irrigation inlet gate (I.I.G.), (i.e., the longer the distance was from the I.I.G. less the yield become).

This yield - variation depended upon the plot location combined with an actual observation that those plots situated on the down stream side of an irrigation canal were often left exposed without water for many hours because of the impeded water flow due to rampant weed growth in the ditch (irrigation canal). Examples of variation on rice yield are described as follows (refer to Table 2 and Appendix 1)

Table-2. Examples of yield-variation in 1987 Season

Name of Block	Plot No.	Rice growth in ripening stage	Area of each plot ①	Total paddy grain yield ②	Average yield ③ (③= ②÷①)	Remarks
	Plot		f.	Tons	ton/f.	
B	No.21	Good	0.924	3.6	3.896	Well-irrigated
	No.2	Poor	0.903	2.9	3.212	More weedy (i) Terminal I.B.C has much weed growth and poor irrigation.
C	NO.19	Good	1.002	3.5	3.493	Poor irrigated
	No.2	Poor	1.002	2.4	2.395	More weedy (ii) Terminal plots were less yielding

(Notes) Field map was attached into Appendix - 1.

② Comparison of yield - records for these four years (1986-89), and some technical information:

Some differences of yield - level among these year season were observed.

Namely: In case of rice variety IR-28.

1986.....2.699 TON / FEDDAN

1987.....3.185 TON / FEDDAN

1988.....2.826 TON / FEDDAN

1989.....2.503 TON / FEDDAN

Details were shown in Figure 1.

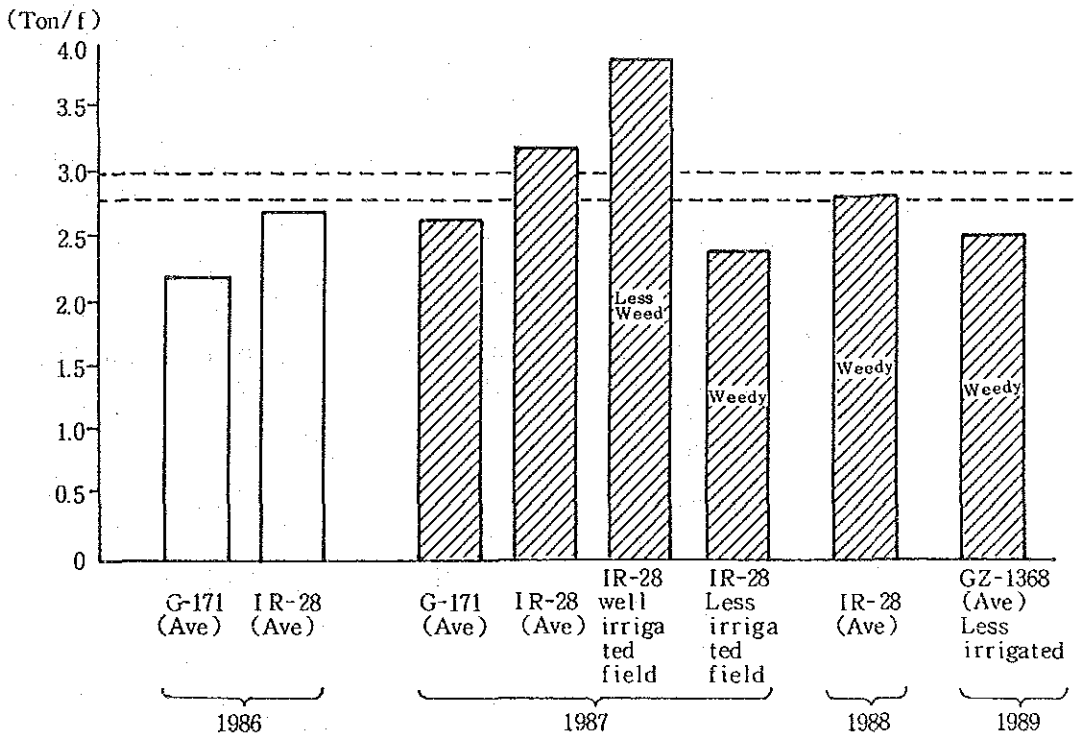


Fig.-1 Comparison of Yield among 4 seasons (1986 - '89)

Mechanical transplanting (1986)

Mechanical transplanting (1987-'89)

In both the 1988 and the 1989 seasons average yield levels were lower than the target (3.00 tons/feddan). On the other hand, the results of actual observation showed that both of the perenial grasses and burnyard grass were increasing much more year by year at the RMC field, due to the following two main causes under the existing conditions :

Namely:

a) Being short of effective weed control methods for perenial grasses, at present

b) Lack of an effective mechanical method of eliminating the ripened seeds of Burnyard grass at the ripening stage of rice growth. During the harvesting time by combine, most of the ripened barnyard grass seeds might be blown down to the surface of the paddy field.

Kinds of dominant weeds in the production field are listed below:

Perenial grasses:

1) Cyperus esculentus (Purple nut sedge)

2) Panicun repens (Torpedo grass)

3) Cynodon dactylon (Burmuda grass)

4) Dyplachne fusca

Annual grasses:

1) Echinochloa crus-galli (Burnyard grass).

2) Echinochloa colonum (Jungle rice).

3) Cyperus difformis

3 Operational process

(A) 1987 Season:

A series of operations on the improved mechanization system were listed up as follows:

(i) Nursery: By using Kubota model Automatic seeding Device (seeder), all the necessary nursery trays were seeded during the period of 10 days from May 10th to May 20th. It was 15 days earlier in this year than in 1986 season. General progresses on the nursery field were satisfactory even though the timing of irrigation were a little bit delayed due to Irrigation Office controls.

(ii) Operation on Regular Paddy Field: It consists of the following twenty-five (25) steps or processes as listed below. Here, imporovement or newly added operational techniques in this 1987 season were shown with asterisks.

Where;

* 1. Plowing No.1 (chisel plow) - Rotary plowing which was done with shallow depth (10cm) in 1986 have been cancelled in 1987.

* 2. Destroying Dike (Bottom plow) - It was to kill perenial weeds on Dike.

3. Harrowing (Disk Harrow).

* 4. Plowing No.2 (chisel plow).

* 5. Plowing No.3 (chisel plow).
Through these two plowing operations deeper plowing (15cm depth) was performed.

* 6. Hard-pan (or deep layer) breaking (subsoiler) - aimed at good drainage.

* 7. Gypsum application (Trailer & Manual) - 1 ton/f. aiming at improvement of high alkalinity soil. It should be continued for three years.

* 8. Dike-making (Dike-making machine) - It is popular in Egypt.

* 9. Basal fertilizer application (Broadcaster & manual) - Ammonium Sulfate 100 kg/f., Super Phosfate 150 kg/f. Potassium Sulfate 30 kg/f. These amounts in 1987 were equal to 125% of that in 1986. (IR-28)

* 10. Irrigation

* 11. Puddling & Levelling (Tractor & wooden-leveller)- In 1986, this operation was carried out by deploying power driven puddling equipment, and the results were found unsatisfactory because of insufficient levelling and too much pulverizing action which created too soft textured a planting

bed. Therefore, this year, the rotary puddler was replaced with a simpler and more literally down-to-earth traditional device.

12. Herbicide application No.1 (manual) - Ron star 21/f.

* 13. Transplanting (Riding type Rice Transplanter)- It continued from June 1st to June 15th (It started and was finished 15 days earlier than in 1986).

14. Replanting (manual).

15. Herbicide application No.2 (manual) - "Mo" granular 12 kg/f. 7 days after transplanting.

* 16. Top-dressing No.1 (manual) - applied 10 days after transplanting. The amounts were as follows;

IR-28 ; 50 kgr. (2 times more than last year's rate.)

Giza-171; 25 kgr. (same as the last year's rate)

* 17. Weeding (manual).

Hand weeding No.1, 6 man-days/f., 30 days after transplanting.

Hand weeding No.2, 6 man-days/f., 50 days after transplanting.

18. Top-dressing No.2 (manual) - The amount was as follows; Both of IR-28 & Giza 171....Urea

25 kg/f.

19. Rice Blast disease control (power sprayer + Swath-nozzle) - For Giza 171 only ....2 times spraying;
    1st time .... 25 days after transplanting.
    2nd time .... immediately before heading.
20. Application of Rat control chemical (manual) at ripening stage.
* 21. Bird control (manual) - at ripening stage.
22. Harvesting (Head-feeding type combine & trailer).
* 23. Straw disposal (straw bailer).
24. Transportation of straw (trailer).
25. Drying grain on concrete flat (manual)

(B) 1988 Season:

Based on the operational process during the 1987 season, the following points were modifyed and improved in the 1988 season.

Namely;

i) Chisel plowing (3 times) --- Irrigation & drainage --- chisel plowing (3 times) --- Rotary harrowing --- hand weeding.

ii) Both, bottom plowing and hardpan breakers operations were cancelled.

iii) Gypsum application was also cancelled.

iv) Side-rake was introduced for collecting straw after

combine harvesting.

v) Circulation type drayer (rice depo) was nicely used.

(c) 1989 Season

Based on the operational process during the 1988 season, the following points were furthermore improved in the 1989 season:

i) Bottom plowing including the destroy of dike--desk harrowing --- chisel plowing (2 times) --- scraper operation for levelling --- irrigation & drainage --- chisel plowing (2 times)

ii) A straw bailer was introduced for the short culm variety Gz-1368 in 1989, instead of a side-rake for long culm variety Giza 171 in 1988.

(3) Practice on other systems :

Practice in crop rotation since the 1988 season has been introduced, aimed at the following two points:

Point 1. To improve the soil's physical property.

Point 2. To get much more income from the production field.

Kinds, production area, total yield and its selling amount (price) etc. are listed below:

1988 Year Summer Season:

Soybean. Total yield 5.5 tons / 30 feddan.

Unit price LE 800/ton.

Total selling amount LE 4,400 (LE 147/feddan)

1989 Year Summer Season:

① Sunflower: Total yield 6.1 tons/13 feddan.

Unit price LE 800/ton.

Total selling amount LE 4,889 (LE 375/feddan)

② Green sorghum: Production area 16 feddan with two harvests.

Unit price LE 130/feddan/each harvest.

Total selling amount LE 4,160 (LE 260/feddan).

1988-89 Year Winter Season:

Egyptian clover: Production area 50 feddan with two

harvests.

Unit price LE 150/feddan/once harvest

Total selling amount LE 15,000. (LE 300/feddan)

Refer to Appendix 2.

In regards to improving the physical property of the soil it was clearly observed that the introduction of field crop rotation has resulted in an improvement of the physical property of the soil which was surveyed in detail by Trial-Dept. (Refer to Fig.2 in III-5-5))

(4) Recommendations :

The following three aspects of reinforcement are recommended for promoting production. They are :

Recommendation 1 : Improvement of crop rotation.
A crop rotation system with a 3-year season cycle should be introduced completely.

Recommendation 2 : Reinforcement of irrigation practice management.

It is better to take the following activities.

a) Establishment of an irrigation management comittee at RMC level.

* The comittee members should consist of :

1. Head & vice head of production division
2. Head of trial department
3. Person in charge of the irrigation pump station
4. Agronomist of agronomy division

* The necessary regulation & action of irrigation practice on the production field must be discussed and determined perfectly.

b) The selection and nomination of a few excellent and skillful workers for being completely responsible for daily irrigation practice.

c) To check and prepare the necessary number of pumps.

Recommendation 3 : The renovation of a weed control system on a large scale.

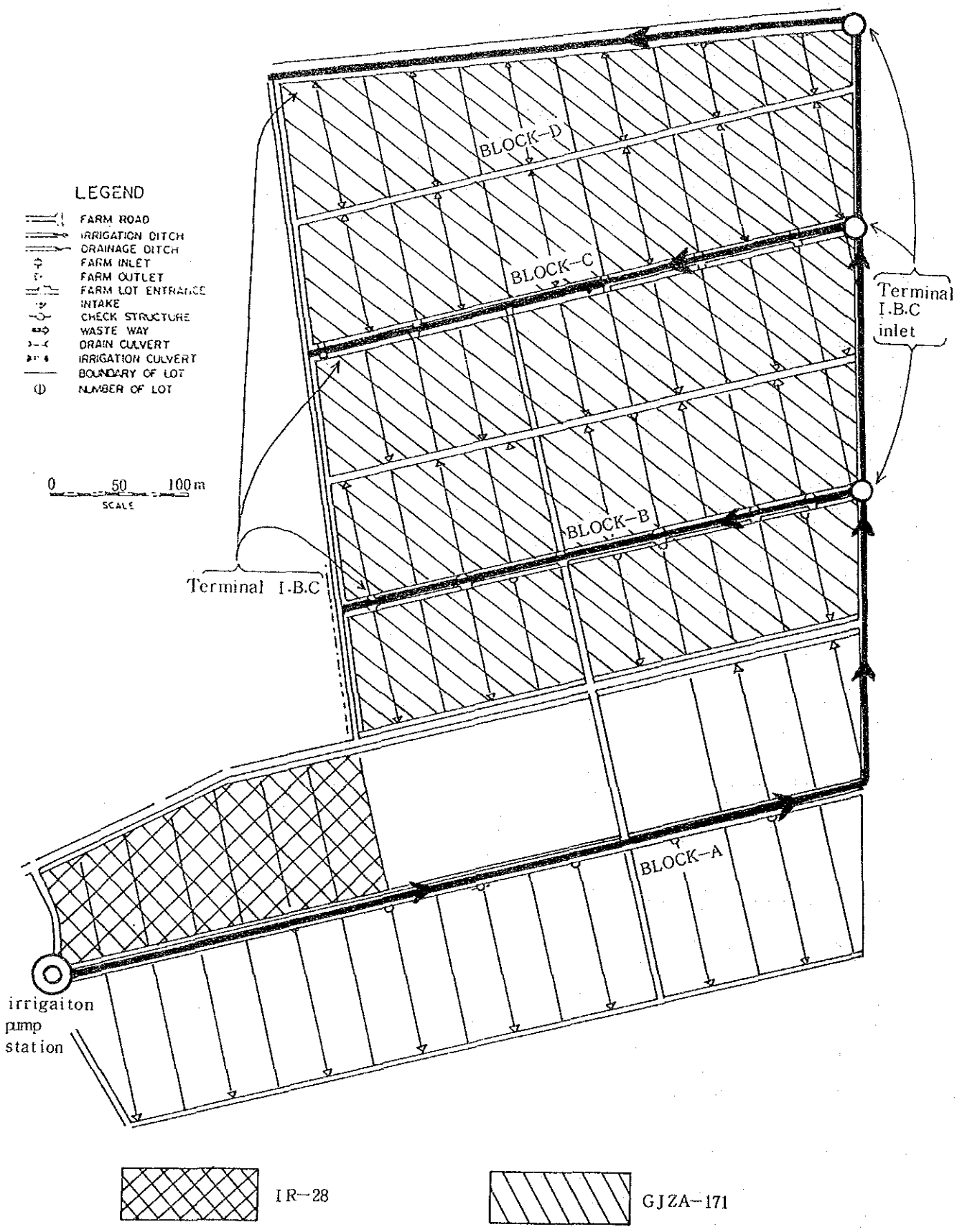
a) To spray (or apply) the effective herbicide (trade name, "round-up") for controlling at the appropriate time perennial grasses.

b) To practice "hand picking of the ripened panicles of burnyard-grass at their ripering stage for prevention against their spread in the next year.

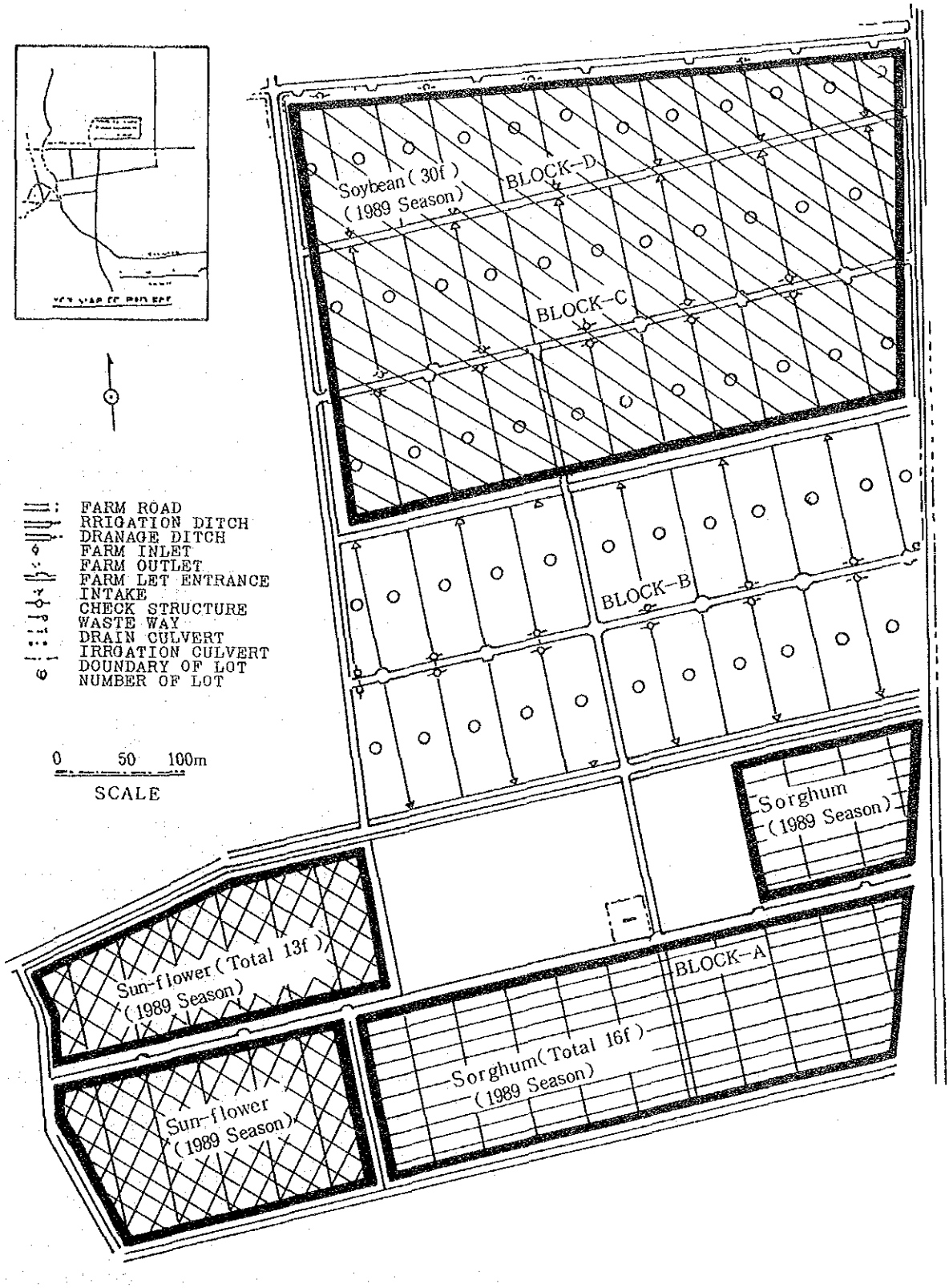
c) It is important that the end plot of each block farthest away from the irrigation branch - canal inlet not be cultivated, but weed - controlled only for one year at an interval of once every few

years. An example of this is the production field at R.M.C.. The reason for this is that complete weed eradication from this most susceptible plot cannot successively be carried out while a crop is sowing.

Appendix-1.


LEGEND
FARM ROAD
IRRIGATION DITCH
DRAINAGE DITCH
FARM INLET
FARM OUTLET
FARM LOT ENTRANCE
INTAKE
CHECK STRUCTURE
WASTE WAY
DRAIN CULVERT
IRRIGATION CULVERT
BOUNDARY OF LOT
NUMBER OF LOT
0 50 100 m
SCALE
BLOCK-D
BLOCK-C
BLOCK-B
BLOCK-A
Terminal I.B.C
Terminal I.B.C inlet
irrigaiton pump station
IR-28
GJZA-171

Appendix-2


Soybean (30f)
(1989 Season)
BLOCK-D
BLOCK-C
BLOCK-B
BLOCK-A
Sorghum
(1989 Season)
Sun-flower (Total 13f)
(1989 Season)
Sorghum (Total 16f)
(1989 Season)
Sun-flower
(1989 Season)
FARM ROAD
RRIGATION DITCH
DRANAGE DITCH
FARM INLET
FARM OUTLET
FARM LET ENTRANCE
INTAKE
CHECK STRUCTURE
WASTE WAY
DRAIN CULVERT
IRRGATION CULVERT
DOUNDARY OF LOT
NUMBER OF LOT
0 50 100m
SCALE
Soybean
Sunflower
Sorghum

2. Demonstration in Five Satellite Fields.

(1) Significance and Objectives of Satellite Fields

It was a proper course in the previous phase of the Project that success in the systematization of the mechanized transplanting method, and it's verification trials outside of RMC motivated and propelled the next step -large scale demonstration in several locations in the Nile Delta. After the course of debate in the Joint Committee, held on the 12th of February, 1987, it was decided to have demonstration farms in five State farms as follows; Gimmeza, Misir, Idfina, Saft Khalid and Serw. The area of each demonstration farm was also the subject of discussion and it was finally decided that there should be approximately 50 feddans in each site. A demonstration farm is called a " SATELLITE FIELD" (hereinafter referred to as SF).

Thus, the demonstration of the mechanized rice cultivation system with transplanter in five SF was decided to be one of the main activities in the final phase of the Project ending on the 31st of March, 1990. The five SF are well distributed over the Nile Delta (see the map). Especially two of them, which are located near the Mediterranien Sea where there is a strong affect by salt in the soil as well as in the irrigation water.

This demonstration could be considered as a final examination to the mechanized transplanting rice cultivation system in the Nile Delta. The principal objectives were set as follows:

i) To verify the mechanized transplanting rice cultivation system in each region

ii) To conduct relevant experiments at any site when necessary

iii) To clarify regional constraints for the system

iv) To transfer technologies to the local staff members at SF

v) To hold field seminars for farmers

(2) Characteristics of the system

Here, we must reconfirm the "established" system as outlined in a previous report and define its special features in comparison with the traditional rice cultivation system, so that we can get a clear focus on our activities in SF. Following are the special features of the established mechanized system:

1) System

(a) Integrated and efficient use of the machinery

(b) The target for the system are medium to small scale farmers (3~5 feddans)

(c) Machines are to be "borrowed" from the hiring centers or some governmental organization

(d) Modern machinery, technology and labour savings

2) Seedlings or seedbed

(e) Raising seedlings in seedling trays

(f) Special intensive care is essential in nursery beds

(g) Special seed treatments (disinfection and salt water selection)

(h) Early sowing (April 20th - May 20th), and early transplanting (May 15th - June 15th)

3) Field preparation

(i) Puddling by mechanical means

4) Transplanting

(j) Use of young seedlings (13-15cm, 2.5 leaf-age, and 20-day seedlings)

(k) Use of transplanter

(l) Fewer plants per hill (4-8) and more hills per m^2 (over 24/m^2) are to be uniformly transplanted

5) Fertilization

(m) Nitrogen (in ingredient) is split-applied as follows: 21kg/f basal application, 8.5kg/f 7 days after transplanting, 8.5kg/f 20 days before heading and 4kg/f at heading.

6) Water management

(n) Intermittent irrigation

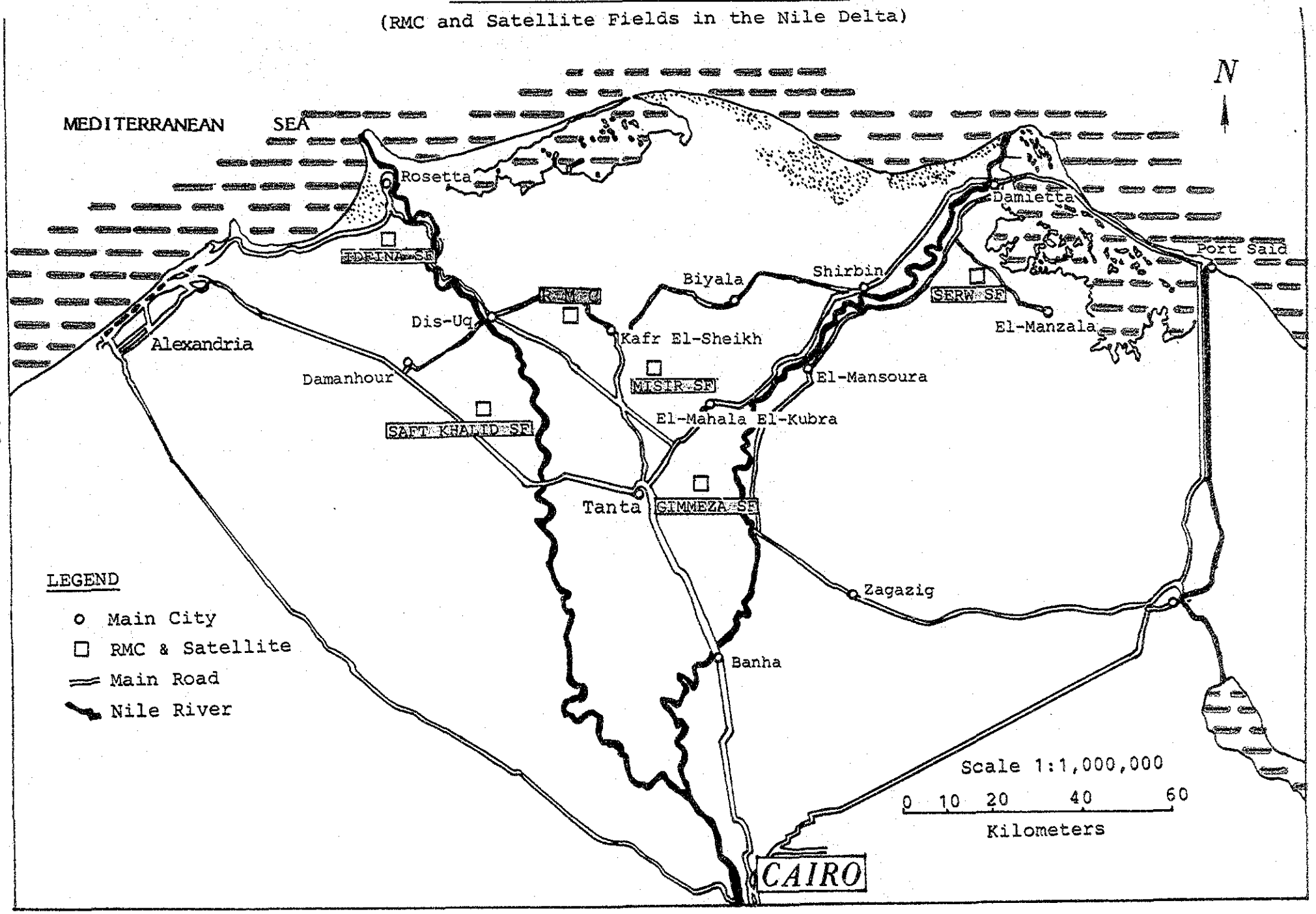
(o) Mid-summer-drainage (35-42 days before heading time, duration around 2 weeks)

7) Harvest, Thresh and Drying Paddy

(p) Use of self-feeding type combine

LOCATION MAP OF THE PROJECT SITES

(RMC and Satellite Fields in the Nile Delta)



(3) General information of each SF

1) Gimmeza SF

Location ..... Gimmeza State Farm No,2 plot (No.1 and No. 18 in 1987 only)
Gimmeza, Gharbiya Governorate

Distance .....Approx. 70km South of RMC (1 1/2 hour car ride)

Total area ..... 40 Feddans (SF)
1,400 Feddans (State Farm)

Cultivated crops .. (Summer) Rice, Cotton, Maize, Forrage
(Winter) Wheat, Barley, Clover, Flax

Irrigation ..... One 24 inch pump takes water from the public main canal where water always flows. This water goes to the main irrigation canal of the State farm, which passes along SF plot

2) Misir SF

Location ..... Misir State Farm - II No.4 plot
Misir, Kafr El-Sheikh Governorate

Distance ..... 30km south of RMC (45 minutes ride)

Total area ..... 45 Feddans (SF)
1,700 Feddans (State Farm)

Cultivated crops .. (Summer) Rice, Cotton, Maize, Pasture
(Winter) Wheat, Barley, Clover, Flax

Irrigation ..... A public irrigation canal runs alongside the SF plot, where water is available, alternately: 4 days ON and 4 days OFF. A

16 inch pump of the State farm raised water during the first year, and an 11 inch pump was facilitated for the SF plot only from the second year on.

3) Saft Khalid SF

Location ..... Saft Khalid State Farm II No.2 plot
Saft Khalid, Beheira Governorate

Distance ..... Approx. 60km southwest of RMC (2 hours ride)

Total area ..... 45 Feddans (SF)
1,300 Feddans (State Farm)

Cultivated crops .. (Summer) Rice, Maize, Cotton, Sorghum
(Winter) Wheat, Barley, Clover, Bean, Flax

Irrigation ..... An 18 inch pump with a 100 Hp engine brings water up from a public irrigation canal where water is available, alternately: 4 days ON and 4 days OFF. Besides, the State farm has another 8 inch pump, driven by a tractor engine, which gets water from a 50 meter well. The SF plot is far from both of the irrigation facilities.

4) Idfina SF

Location ..... Idfina State Farm No.5 plot
Idfina, Beheira Governorate

Distance ..... Approx. 60km northwest of RMC (2 hours ride)

Total area ..... 35 Feddans

400 Feddans (State Farm)

Cultivated Crops .. (Summer) Rice, Soy bean, Maize, Pasture

(Winter) Barley, Clover, Beans

Irrigation .....A 12 inch pump with a 60 Hp engine raises water from a public irrigation canal, but, because of the water shortage, is mixed with drainage water which is salty,

Special feature ... The soil is saline all over this region

5) Serw SF

Location ..... El-Serw State Farm I No.4 plot

El-Serw, Damietta Governorate

Distance ..... Approx. 120km east of RMC (2 1/2 hours ride)

Total area ..... 45 Feddans (SF)

1,500 Feddans (State Farm)

Cultivated crops .. (Summer) Rice, Cotton, Forrage

(Winter) Wheat, Barley, Clover, Forrage

Irrigation ..... There are two pumps. One has a 65 Hp and the other has a 125 Hp engine. Each one takes water from a public irrigation canal where water is available, alternately: 4 days ON and 4 days OFF. The SF plot is far from those two pumps.

Special feature ... The soil is strongly affected by salts.

(4) Progress and performance in each SF

1) Gimmeza SF

During the first year two plots were used for SF demonstration. They were about 2km apart, and this precluded the efficient operation. Besides, more than ten feddans were heavily damaged by sparrow attack, bringing the yield down from 4.2t/f (neighboring plot record) to only 0.2t/f (most heavily attacked plot). In spite of all the bad luck, the average yield of this SF was the highest among the five SF. This seems to be due to the high productive potentiality of the region.

Big progress was recorded in the following year (1988) due to the transference of the SF plot. Only one plot of 40 feddans had been employed for SF demonstration. Although there was a sparrow attack that year, the damage was not as heavy as that of the previous year. 3.57 t/f average annual yield can be highly appreciated when we consider that the national average is 2.5 t/f.

During the final year (1989)(thanks to the rearrangement of the infrastructure) the farm operation became much quicker and easier. This is to say that farm mechanization requires well-arranged field-infrastructure in order to increase the efficiency of the machines.

Eventually, an average yield of 3.65t/f was obtained from this SF. And for a farm operating on a large, practical scale, this is the highest record in this Project, including R M C.

Table (4)-1) Results of demonstration - Gimmeza SF

Year	Staff in charge	Expert in charge	Used var.	Cult. area (f)	Total Prod. (t)	Average Yield (t/f)	Inc. Ratio (%)
1987	Ahmed El Khtiar	I.Matsumoto H.Niki	Giza172 Giza181	45	123.7	2.75	-
1988	-same-	H.Niki	Giza181 IR 28	37.5	134	3.57	+30%
1989	-same-	H.Niki K.Sakamoto	Giza181 GZ 1368	39	142.2	3.65	+ 2%

2) Misir SF

The soil fertility in this SF is tolerable, while the water availability is not so good. Although the public irrigation canal runs alongside the SF plot, water comes alternately: 4-days ON 4-days OFF. During the " water ON" time as much water as possible must be pumped up to the field. Consequently, the pump capacity is the limiting factor for water supply and, at the same time, of course, for the entire yield as an outcome.

SF demonstration operation during the first year (1987) depended on water from the State farm pump, by which the State farm irrigated to their own 1,700 feddans. Water was rationed to the SF tightly, and this fact obviously checked the rice plant growth. An 11 inch pump was installed by the SF in the second year (1988). However, the apparatus was so old that it had a lot of machine troubles. Besides this, the spare parts

Table (4)-2) Results of demonstration - Misir SF

Year	Staff In charge	Expert in charge	Used var.	Cult. Area (f)	Total Prod. (t)	Average Yield (t/f)	Inc. Ratio (%)
1987	Alaa Eid	I.Matsumoto H.Niki	Giza172 Giza181	45	89.1	1.98	-
1988	-same-	T.Kato	Giza181	45	69.4	1.54	- 22%
1989	-same	H.Niki K.Sakamoto	Giza181	45	140.2	3.12	+102%

were not accessible on the site, nor at RMC. Irrigation was stopped many times and for long periods. The low yield during the second year can be attributed to irrigation failure.

Considering this fact, during the final year (1989) special importance was put on the water supply at this SF. The pumping system was reinforced by two new 6 inch pumps and the existing old pump was completely overhauled. These tactics were rewarded with a bumper crop. Recording 102 % increase compared to the previous year, the average yield of the 45 feddans reached 3.12 t/f(7.42 t/ha).

3) Saft Khalid SF

Chronic water shortage is the principal and only problem in this SF. Through the first two year's operation, it suffered so much that even an average yield of 2 tons/f could not be achieved. The State farm (in which SF exists) is, itself, suffering from a water shortage, which was well-described in the report of short-term expert - S.Hosono

Table (4)-3) Results of demonstration - Saft Khalid SF

Year	Staff in charge	Expert in charge	Used var.	Cult. Area (f)	Total Prod. (t)	Average Yield (t/f)	Inc. Ratio (%)
1987	Mohamed Zeyada	I.Matsumoto H.Niki	Giza171 Giza181	45	84.6	1.88	-
1988	Aatef Amar	I.Matsumoto	Giza181	45	73	1.62	-14%
1989	-same-	H.Niki K.Sakamoto	Giza181	41.5	85.0	2.05	+27%

(RMC,May 1987). Meanwhile, the yield of the State farm is always lower than that of the SF demonstration. This fact signifies that the mechanized rice cultivation system is better than the traditional cultivation method.

During the first year, the former crop (broad beans) occupied half of the SF plot till the end of June, so land preparation and the transplanting operation were fatally delayed.

The water supply situation during the second year (1988) was worse than the first year. The main pump of the State farm broke and water stopped completely for three weeks just after all the transplanting work had been finished. Naturally, the rice plants withered from drought.

Circumstances remained about the same during the final year (1989). The constraint factor was in the hands of the State farm. Still, the target yield (2t/f) has been exceeded, on average.

All in all, it is quite remarkable that reasonable yields were obtained during three year's of operation in spite of all the unfavorable conditions. The manager of this SF deserves

to receive a high reward as well as other SF managers, who were sent by RMC.

4) Idfina SF

The average rice yield in this State farm is less than one ton per feddan most of the time. This Idfina region is affected by soil salinity, and even the farmers suffer from salt injuries. Besides this fact, from the first year, the SF plot could not obtain irrigation water (which contains relatively low salt) and was obliged to use drainage water (in which the level of PH - as well as EC - are as high as 8.5 and 1.5, respectively). This kind of water must be changed as frequently as possible in order to keep salt out of the field. It is quite remarkable to get more than a 2t/f average yield in practical large scale against all of these disadvantages. However, the average yield increased during the final year (1989). This was partly due to infrastructural rearrangement, partly due to an additional pump, but mainly due to the effort of the manager in charge of this SF demonstration.

Table (4)-4) Results of demonstration - Idfina SF

Year	Staff in charge	Expert in charge	Used var.	Cult. Area (f)	Total Prod. (t)	Average Yield (t/f)	Inc. Ratio (%)
1987	Abd EL-Gawad	I.Matsumoto H.Niki	Giza171 Gz 1368	35	71.8	2.05	-
1988	-same-	I.Matsumoto	Gz 1368 IR 28	35	68.1	1.95	- 5%
1989	-same-	H.Niki K.Sakamoto	Gz 1368	35	80.3	2.29	+18%

5) Serw SF

This area is the most heavily salt-affected in the Nile Delta so that the average yield from the State farm (as well as from the farmer's land) is quite low. In addition, the distance from RMC to this SF is the greatest among all SF. This "remoteness" interfered with smooth communications and the transportation of machines and equipment.

The operation of this SF during its first year was not less than a struggle. And it must have been a heavy burden for the staff members and their assistants (who were assigned to this SF) just to live in such an isolated and inconvenient place like Serw.

During the second year-(1988) the new staff member tried his best to raise the yield, and succeeded in obtaining more than had been expected. A 67% increase was recorded.

Unfortunately during the final year (1989) this staff member was sent to Japan to attend a training course. The new

Table (4)-5) Results of demonstration - Serw SF

Year	Staff in charge	Expert in charge	Used var.	Cult. Area (f)	Total Prod. (t)	Average Yield (t/f)	Inc. Ratio (%)
1987	Mohamed Hilar	I.Matsumoto H.Niki	Giza171 Gz 1368	45	55.0	1.22	-
1988	Abd El-Fadil	H.Niki	Gz 1368 IR 28	45	92	2.04	+67%
1989	Mohamed Zeyada Mohamed Shawat	H.Niki K.Sakamoto	Gz 1368	45	82	1.82	-11%

staff member was not accustomed to the area, nor to SF operation. Furthermore, he could not understand English and the chief of the SF department (whom we expected to be an interpreter) retired suddenly in April and this vacancy was not filled. Consequently, minimal communication was held between the Japanese expert and the staff.

However, there is no doubt that the overall record for this SF during the Project term is quite outstanding and merits the highest appreciation.

(5) Advice and Guidance for the Operation, Maintenance and Repair of Agricultural Machines

The actual operations (land-preparation, rice transplanting, harvesting, and so on) of the five SF was a large- scale experiment - a putting into practice - of what we have taught the mechanics and operators about machinery operation, maintenance and repair in the RMC.

The various mechanical activities at the five SF gave us a good chance to review and evaluate the technical levels of our mechanics and machine operators. Through a program of on-the-job training we have been able to raise these levels of competence.

There is a great concentration of work involving machinery and equipment from the end of March till the end of June. There are many inspections and tests to be completed, along with routine field procedures such as harvesting the rotation crop, plowing, land preparation, rice sowing or planting, and so forth.

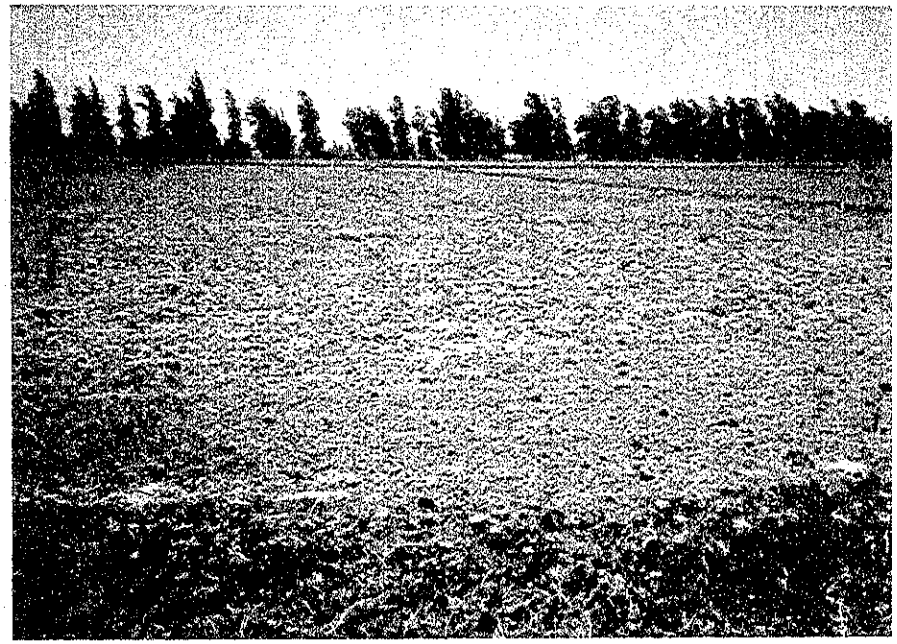
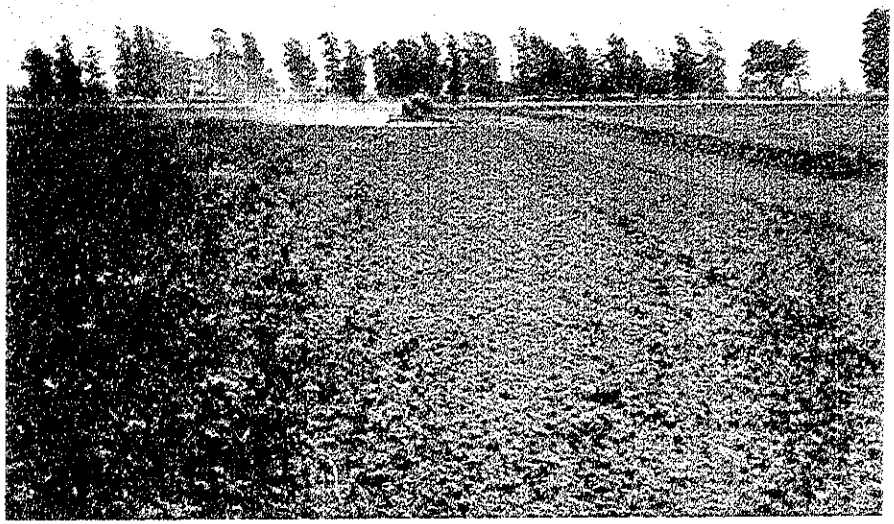
This is also a time of unexpected machinery repairs due to breakage of parts, accidents to equipment while in operation, etc.

During this extremely busy season it is virtually impossible for one person in charge to supervise the on-the-job training program, oversea all the mechanical repairs and operations in the five SF, and at the same time to fulfil his regular duties at the RMC.

1) Advice and Guidance on Agricultural Machines Operation and Working Method

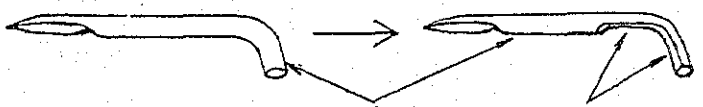
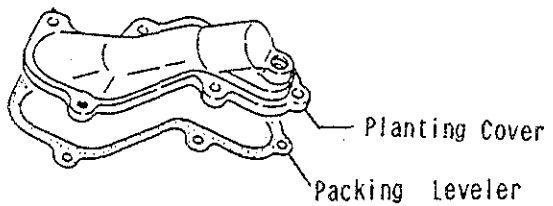
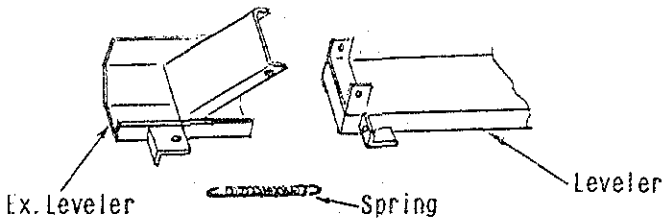
Contents of Main Advice and Guidance

Problem Situation	Contents of Advice and Guidance
Working depth of a chisel plow was not stabilized.	1) Suggested that an operator adjust the top link angle about 15° (changed the joint point of top link bracket) 2) Suggested that during operation that the top link length be adjusted so that the frame of the chisel plow is horizontal when viewed from the side. 3) Proposed an operation method of position control and draft control.
Berseem(Egyptian clover) was not harvested on time thus the field was not cultivated on time.	1) Suggested the rental of a flail mower and to chop the berseem (Egyptian clover) that was not harvested on time after 3 days of chopping.
Prepared field was crushed by trucks, trailers and wheel loaders that were used to repair the farm road and the canal	1) Recommended a second cultivation with a chisel plow and a second preparation of the soil by the puddling harrow. 2) In another field cultivation was done by rotary tiller.
A tractor and a riding type rice transplanter sank in an irrigated field because the field did not have a hard soil plate.	1) Suggested a second cultivation and preparation of soil after drying field for one week. 2) Planted the field with walking type rice transplanter as the riding type rice transplanter sank(beside canal and four corners of field).

Problem Situation	Contents of Advice and Guidance
Transplanting occured late thus nursery plants were overgrown	1) Nursery plants were cut to a height of 20-25 ㎝ so that they could be employed by the transplanter
Weeds were growing on preparation field. 	1) Weeded by puddling harrowed when dry condition occured. 

2) Advice and Guidance of Maintenance and Repair

Contents of Main Advice and Guidance

Problem Situation	Contents of Advice and Guidance
Planting tines of the rice transplanter became worn and seedlings were not being pulled up correctly.	Planting tines were exposed by making the bolt holes longer. 
Push rod worn resulting in a clearance of the planting tine and the push rod was covered thus the nursery plants were not delivered and were caught between the planting tine and the push rod.	Processed Planting Tine 
The packing of a planting arm was missing when the planting arms were overhauled.  	Substituted paper that had been steeped in oil.
Spring of the puddling harrow extension leveler dropped out.	A belt made of an old tyre tube was used as a substitute. (Fig. 2~3) 

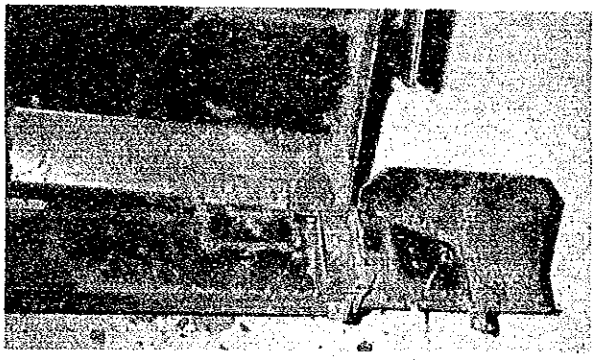
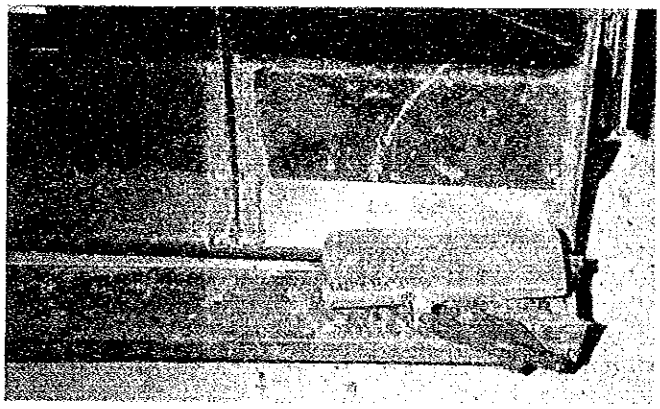
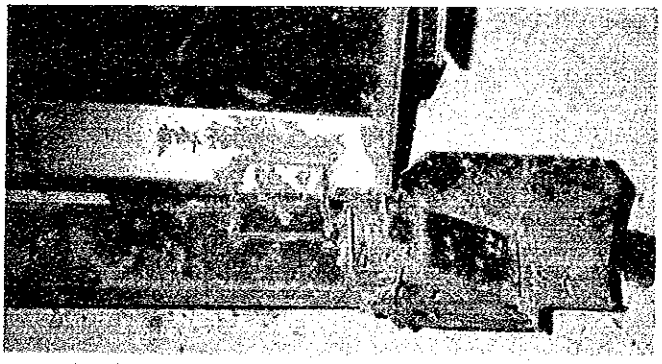


Fig. 2. Spring of the puddling harrow extension leveler dropped out.



Fplded the extension leveler.



Extended the extension leveler.

Fig. 3 A belt made of an old tyre tube was used as a substitute.

(6) Impeding factors of the mechanized rice cultivation system in each SF.

One of the main objectives in SF operation used to be to clarify the special regional conditions for the mechanized rice cultivation system, and especially to discover any impeding factors and, if possible, to solve them. That is why five locations far from each other in the Nile Delta were selected as SF demonstration plots.

Although there are several general problems for the Delta area (such as water shortage) they are not mentioned here. Also, social and economic problems are excluded from this section.

As for the overall assessment of regional constraints, it can be said that only the salinity problem in the coastal region is serious and all other factors favor the mechanized rice cultivation system. Any how, the impeding factors and their countermeasures in each SF are as follows :

1) Gimmeza SF

i) Stem borer - Chilo agamemnon Bles

This pest is common in this region and seems to be increasing year by year. Some special measures may be needed if the attack seems to be heavy.

< Countermeasure > .... Furdan 10 % (or Lindane 5% or Dursban 10%) 50 days after transplanting

ii) Rice blast ..... Pyricularia oryzae

This disease is common in the Nile Delta, but during the past few years the heaviest damage has been reported from this region. Also, quite virulent symptom were observed in this SF plot. This must be considered for the future.

< Countermeasure > ..... Use a new resistant variety (e.g. Giza 181), or application of fungicide (Tricyclazole 20% or Probenazole 8%) during maximum tillering stage or booting stage.

iii) Recommended variety ..... Giza 181

2) Misir SF

i) Green worm .....Agrotis ipsilon

This worm was found in the nursery during the first year. It was controlled easily by insecticide. No further damage has been observed since then. Therefore, no special measure should be taken for this pest. Only with a heavy attack in a nursery bed would some insecticide application may be reasonable.

< Countermeasure > .... Furdan 10% (or diazinon 10%)

ii) Recommended variety ..... Giza 181

3) Saft Khalid SF

i) Rice Blast

This disease was observed during the first and second years, though the severity was mild. No special measure is needed so far, but constant observation is useful for future

operation.

ii) Recommended variety ..... Giza 181

4) Idfina SF

i) Soil salinity

The soil salinity level and the PH level are high enough to cause severe damage to the rice plant if there is some water- management failure.

<Countermeasure> ... 1. Desalinization by frequent water changes
2. Use of a tolerant variety (Gz 1368)
3. Thorough land-leveling
4. Use of irrigation water, Not drainage water

ii) Brown spot ....Helminthosporium oryzae

This disease is associated with soil salinity. Since it decays the root system of rice plants, the rice plants themselves may suffer from a nutritional disorder. This nutritional disorder is said to be the main cause of brown spot disease (see detail on I-1-(2)-4)-b).

< Countermeasure > .....In addition to the countermeasures for soil salinity, an increase of potassium and nitrogenous fertilizer may be effective.

iii) Recommended variety Gz1368

5) Serw SF

i) Soil salinity

As mentioned already, soil salinity is dreadfully strong

in this region. Several complex injuries from this can be observed.

< Countermeasure > .... Same as the Idfina case

ii) Brown spot

More severe damage from this disease is seen in this region.

< Countermeasure > ....Same as the Idfina case

iii) Recommended variety Gz1368

(7) Dominant Weeds in each Satellite Field

The major noxious weeds in each Satellite Field are as Table 1.

The Satellite Fields are now operated with continuous cropping of rice and the next season will be the fourth successive year of operation. It is commonly known that continuous cropping multiplies specific weeds as well as pests and diseases. Consequently, more weeds are surely anticipated to appear and bother the operation. Thus, an integrated weed-control operation is required in all Satellite Fields.

Table 1. Noxious weeds in each SF

Name	Annual weeds	Perennial weeds
Gimmeza	Cyperus difformis Echinochloa colonum Echinochloa crus-galli	Cyperus esculentus Phragmites Imperata cylindrica
Misir	Cyperus difformis Echinochloa colonum Echinochloa crus-galli	Cyperus esculentus Phragmites
Idfina	Echinochloa colonum Echinochloa crus-galli	Scirpus planiculmis Phragmites australis Cyperus esculentus Cynodon dactylon
Serw	Echinochloa colonum Echinochloa crus-galli Cyperus difformis Ammania Spp.	Scirpus tuberosus Diplachne fusca Cyperus esculentus
Saft Khalid	Echinochloa colonum Echinochloa crus-galli Cyperus difformis	Scirpus tuberosus Cyperus esculentus Phragmites