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THE REPUBLIC OF KOREA

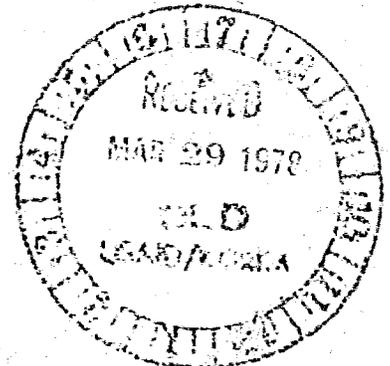
Agricultural Research Project

A.I.D. Loan No. 489-T-088

QUARTERLY PROGRESS REPORT

for

Oct. 1, 1977 — Dec. 31, 1977



Crop Improvement Research Center

Office of Rural Development

93/78

Mr. Dennis P. Barrett
AID Representative
USAID/KOREA
US Embassy
Seoul, Korea

March 1978

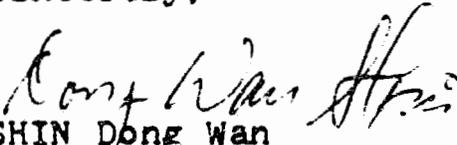
Subject: Quarterly Progress Report No. 4
(AID LOAN No. 489-T-088)

Dear Mr. Barrett:

The quarterly Progress Report of the USAID/KOREA CROP IMPROVE-
MENT LOAN for the fourth quarter, 1 October --- 31 December,
1977; is herewith submitted according to AID regulations.

Your comments and continued support of the program would be
most appreciated.

Sincerely,


SHIN Dong Wan
Director

Quarterly Progress Report

October - December 1977

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I. HIGHLIGHTS

A. Fourth Quarter 1977 progress achieved during the period of 1 October ---31 December 1977 is summarized in this report of the CROP IMPROVEMENT AID LOAN PROJECT executed by the Crop Improvement Research Center (CIRC) of the Office of Rural Development (ORD), Suweon.

B. Significant Achievements accomplished this quarter and developments included:

1. Project completion rate of 63%,
2. Placement and provision for dispatch of trainees,
3. Extension of TDD and TDFA,
4. Ordering of majority of equipment and periodicals,
5. Continuation of English language training, and
6. Approval for purchase of FDP 11/70 computer.

II. PROGRAM PROGRESS

A. Status of the CROP IMPROVEMENT AID LOAN PROJECT initiated in April, 1974, and now nearing the fourth year of completion is summarized in TABLE I. A comparison between planned and results of project activities is also given in TABLE I. As of this quarter, a project completion rate of 63% was achieved.

I. International Training received top priority this quarter, with major emphasis placed on placement of balance of Ph.D. and M.S. students at United States and accredited universities. Additional graduate training for researchers overseas in major cropping fields of the project is one means of

Progress Status

TABLE I

A. Comparison between planned and result of activities :

No	Project Title	Planned	Result			Weighted % of project	Item % complete	Project % complete
			Before Setember 30,1977	Reporting period	Total			
1	Research experts	456 mon	222	20	242	20	53.1	10.6
	o Long term	348	190	18	208	(70)		
	o Short term	108	32	2	34	(30)		
2	International training	91 psn.	33	8	41	20	45.1	9.2
	o Ph. D. course	20	11	0	11	(50)		
	o M.S. course	23	8	1	9	(50)		
	o Non-degree & Refresher course	48	16	5	21	(20)		
3	International conferences	44 psn.	21	11	32	5	72.7	3.6
4	Books, journals, research supplies & equipment	(unit:\$1,000) 1,633	39	-	39	15	40.0	6.0
5	Employment of supplementary personnel	86 psn.	70	-	70	10	81.4	8.1
6	Experimental research	5 (research field)	5	-	5	20	80.0	16.0
7	Construction of research facility	6,000 m	5,695	-	5,695	10	94.9	9.5
	Investment							
	Loan	\$5,000,000	\$1,194	89	1,293			
	Additive Won	W1,621,000,000	1,062	114	1,176			
	Total					100		63.0

ensuring continued progress in crop improvement in the Republic.

Because of time requirements for advanced degree training, two years for a M.S. degree and a proportionately longer period for a Ph.D. degree it was necessary to expedite dispatch of trainees. As of this quarter, 50% of Ph.D. trainees have enrolled, with the balance to be sent abroad the first quarter of 1978 (TABLE I). M.S. degree candidate dispatch rate through this quarter is 30%, with the balance (9 candidates) to be sent in the first six months of 1978.

2. Trainee Dispatch for both academic and short-term training was expedited considerably. Provision was made with IIE (International Institute of Education) and the USDA to assist in placement of all trainees. Previously, all placement was conducted on a personal basis through expatriate consultants. Although effective, this procedure was not efficient due to time required for correspondence and capability of handling the large number of trainees.

3. TDD/TDDA Extension was officially sanctioned this quarter. The TDD (Terminal Disbursement Date), 28 July 1979, remains the same for all project activities, with the exception of academic training. A TDD of 30 September 1980 was established for trainees in advanced degree programs. Due to delays in registering students for graduate programs, principally due to time required for language proficiency and university placement, the new TDD extension will allow for completion of studies.

The TDDA (Terminal Disbursement Date Authorization) was extended for one year, from 30 January 1978..to 30 January 1979. With initial delays in ordering Equipment for the program, the one year extension will assist in

ultimate selection of the most appropriate equipment.

4. Equipment Purchase was finalized for the majority of laboratory and field equipment, laboratory reagents and supplies, and library materials ---including books, periodicals and journals, and critical backfiles of the key publications. Since the items had to be priced, specifications and final pricing and bid totals were prepared by IIE for the majority of items. On receipt of formal price quotations, final ordering procedures were initiated through OSROK (Office of Supply, Republic of Korea), IIE, or direct proprietary purchase with the manufacturer. Prior to this quarter, only \$39,000 had been spent on research equipment and supplies. Ordering of the majority a balance of \$1,594,000 was completed this quarter, with most of these materials to be received in the first six months of 1978. The extension in TDDA will also allow for the additional procurement of spare parts after receipt, installation and initial operation of equipment. It will also permit purchase of further required supplies.

B. Rate of project progress, with a comparison of planned activities and those achieved, is given in TABLE II. and the accompanying PPTS (Project Performance Tracking System). Significant Progress was achieved in the fourth year as the project approaches the completion date. Academic training is the only category not completed under provisions of the original five year program. This activity will be successfully completed under the extended TDD for training.

C. Percent Completion of project activities to date through this quarter reporting period was 63% (TABLE II). Percent completion of major individual component items was:

1. <u>Research experts</u>	53.1%
2. <u>International training</u>	45.1
3. <u>International conferences</u>	72.7
4. <u>Equipment & periodical orders</u>	40.0
5. <u>Employment of supplementary personnel</u>	81.4
6. <u>Experimental Research</u>	80.0
7. <u>Construction of research facilities</u>	94.9

TABLE II

P. Progress Rate by Activity

No	Activity	Weigh- ted % of Pr- oject	Item % Complete	Project % Comp- lete	1974		1975		1976		1977		1978		Perce- ntge 100
					J	D	J	D	J	D	J	D	J	D	
	Total	100		63.0	0	20		50		80		90		100	90
1.	Research experts	20	53.1	10.6	0	10	40	50	90					100	80
2.	International training	20	45.1	9.2		2	0	10	40	70		90		100	70
3.	International conference	5	42.7	3.6	0	20		40		60		80		100	60
4.	Books, Journals, Research Supplies & Equipment	15	40.0	6.0	0	40		65		90		97		100	50
5.	Employment of Supplementary Personnel	10	81.4	8.1	0	20	40		80		100			100	40
6.	Experimental research	20	80.0	16.0	0	20		40		60		80		100	30
7.	Construction of research facility	10	94.9	9.5	0	30		50		65		85		100	20
															10
															0

———— Planned
 - - - - - Result

TABLE III

List of Overseas Trainees Dispatched During the Final Quarter, 1977

Course	Name	Organ	Location of institution	Duration	Discipline
MS	Kim, Jang-gyu	IAS	IRRI	Oct.77-Oct.79	Rice pathology
Training refresher	No, Nung-ju	Res.Bu	USDA	Nov.77-Jan.78	Library Operation
	Kim, Gang-gwon	HES	CIP	Nov.77-Feb.78	Potato breeding
	Kim, Seon-gyong	AES	"	"	"
	Mun, Heon-gwi	CES	CIMMYT	Dec.77-Jun.78	Crop. systems
	Kim, Gwang-ho	CES	IRRI	Dec.77-May 78	Rice Breeding
International Conference and observation	Im, Mu-sang	CES	Australia, Philippines	Nov.77-Dec.77	Rice seminar
	Yi, Un-ung	COA	"	"	"
	Lee, Yong-Seok	CIRC	USA, Mexico	Oct.77-Nov.77	Centralized Laboratory operation
	Kim, Sun-kwon	CES	Thailand	Dec.77	Conference on grains
	Ghoe, Hyon-ok	"	IRRI	"	Rice
	Kim, Dong-su	Res. Bu.	"	"	"
	Bak, Sok-hong	HCES	"	"	"
	Jeong, Bong-jo	IAS	"	"	"
	Bak, Nae-gyong	YCES	"	"	"
	Bak, Jung-su	IAS	"	"	"
Chung, Gun-shik	CES	"	"	"	

III. OVERSEAS STAFF TRAINING

Training programs for Korean staff constitute one of the most important aspects of the program. Overseas training, both academic degree and short-term observation, is recognized as a chief means of enhancing the quality of research knowledge and techniques relevant for crop improvement. The training component constitutes 32% of the total budget, or \$1,593,000. A detailed listing of overseas trainees dispatched during the final quarter of 1977 is given in TABLE III.

A. Accomplishments this quarter included dispatch of only one (1) M.S. course candidate and five (5) students for training and refresher courses, total of six (6) personnel.

1. Academic trainees to date totaled only 45%, as opposed to the 90% originally planned. As indicated previously, a significantly higher number of trainees will be sent for training the first quarter of 1978.

2. International Conferances/Observation Trips for staff training and refresher courses were on schedule. Status of this type training was 81.8%, against the original plan of 80%. This level is indicative of the problems faced in prerequisites of academic training.

3. IIE Assistance in placement of both academic and non-degree training was arranged and initiated this quarter. Non-degree training was allotted to the International Training Division of the USDA, Washington. Degree placement training, and reimbursement for all training costs were assumed by IIE.

Standard biodata forms were completed for all candidates and forwarded

this essential component will be completed with the assistance of the extended TDD for training.

C. Language Instruction

CIRC continued operation of an English language program geared to assist staff pass TOEFL and LATT tests. The course was taught by Peace Corps Volunteers. This quarter, the teaching staff was reduced from two (2) instructors to one. This decision was based on the fact that the majority of trainees had already been placed on the basis of TOEFL tests taken in 1976 and 1977, and candidates required preparation now for only the required national LATT test for non-academic training.

It should be pointed out, however, that difficulty and scope of the LATT test has increased in recent months to a status of a "junior" TOEFL test. Thus, further preparation was required. Both day and night classes were held this quarter, with a total of 45 students attending. Of thirteen (13) staff who took the LATT test this quarter, eight (8) students or 61.5% passed (TABLE IV). Results of scores of TOEFL tests are pending.

to IIE. Placement was then expedited by phone calls to various institutions by IIE. Formerly months of correspondence between Korea and schools in the States were required, a time-consuming and most inefficient process.

B. Constraint.

The major problems involved in training are summarized:

1. English Language requirements, including the TOEFL (Test of English as a Foreign Language) for academic candidates, and the LATT (Language Art Training and Testing) test necessary for non-degree trainees, were a major hurdle. It was also evident senior staff with years of service and more qualified in research programs, were deficient in English and unable to pass required language examinations. Personnel assigned outside Suweon also had less exposure to English and working with foreign experts, and this added further to language inadequacy.

2. Tenure was also a factor. Senior staff had top priority for training, but also had language problems. In some cases there was also reluctance on the part of institutional or station directors to release key personnel in departmental activities for prolonged periods of study overseas.

Junior scientists, in many instances, were more highly qualified in English. However, they were short on experience and practical knowledge of field experimentation.

3. Placement Procedures, have already been mentioned. It must be re-emphasized, however, that valuable time was lost in not making use of the available facilities of IIE. Although there is late placement of trainees,

IV. EQUIPMENT AND SUPPLIES

Procurement of equipment by AID Loan Funds was delayed in early years of the project, but was compensated for this quarter by the "expedited delivery into Korea of the experimental equipment/instrument plan." Remodeling of the Centralized Laboratory was completed the previous quarter. Orders for equipment and supplies for this unit and the respective research institutions and FORD's (Provincial Office of Rural Development) were placed, value of \$400,000.

A. Ordering of equipment and instruments was through OSROK. Some sole source items of equipment were ordered on proprietary purchase directly through the manufacturer. Some of these proprietary purchase items included:

1. Otaki noodle maker,
2. McGill rice miller,
3. Self-propelled grain drills,
4. Lambda leaf area meter, and
5. Soil testing kits.

Some equipment and supplies on these orders have already been shipped to Korea. A total of \$16,500 in glassware was ordered directly through IIE. Books for the library (455 volumes) and 284 periodicals and journals on a multi-year subscription basis were also ordered through auspices of IIE.

B. Listing of items ordered by category is given in TABLE V:

TABLE IV

LATT Scores

Oct. 1-Dec. 31, 1977

Organization	Name	Written Oral		Average	1)	2)
					0	X
Wheat & Barley Res. Ins.	Seong, Byong Eyeol	41.2	52			X
Agri. Science Ins.	Sin, Kwan Chul	77	58	67	0	
CIRC	Kim, Seong Pil	58.5	70	64.2	0	
Kyunggi P.O.R.D.	Song, Nam Hyun	68.2	64	66	0	
Horticultural Exp. Sta.	Kim, Seong Yeol	27.3	50			X
Wheat & Barley Res. Ins.	Kim, Yi Yeol	35.3	58			X
CIRC	Moon Yun Ho	66.2	64	65	0	
Jeju P.O.R.D.	Kim, Kwang Ho	26.3	56			X
CIRC	Chang, Chang Mun	64.9	60	60	0	
"	Lee, Chin Suk	60	60	60	0	
Crops Exp. Sta.	Lee, Do Won	28.5	50			X
Horticultural Exp. Sta.	Chung, Hyun Chae	33.1	58			X
Kyungnam P.O.R.D.	Han, Kyul Young	59.6	70	64	0	
Agricultural Science Ins.	Han, Sang Soo	63.2	50	60.6	0	

1) 0 = Pass

X = Fail

replaced by one of "Collective invitation by discipline." In 1978, a total of forty-two (42) short term consultants are planned for collective invitation. Consultants will be invited on the bases of team/discipline, and will participate in joint reviews of specific programs. The majority of these consultants. On this basis, it will be possible to invite higher level specialists. This procedure will thus contribute more effectively to stronger recommendations, and hopefully implementation of programs with more significant impact on the major crops.

B. Listing of Foreign Experts assigned to the project the last quarter of 1977 includes:

TABLE VI

Category	Name	Discipline	Months served
Long term	P.C. Lippold	Co-Director	3
	R.L. Beacher	Cropping Systems	3
	W.L. McProud	Barley/Wheat	3
	J.L. Franckowiak	Potato	3
	D. Neeley	Biometrics	3
	D.O. Diltz	Agr. Economics	3
Short term	M.J. Diltz	Library Operation	2
TOTAL:	7 persons		20

TABLE V

Procurement of Equipment/Instruments and Books (Final Quarter, 1977)

Items	Types and Q'ty	\$ Cost	Ordered Through
Equipment/instruments and machine	198 types 391 units	400,000	OSROK
Glassware	94 types	16,500	IIE
Book	Independent: 455 vol. periodicals 284 titles	10,000	"

C. Computer Purchase was authorized by AID/Washington, provisions were made to order a Digital Equipment Corporation PDP 11/70 unit. Estimated cost is \$237,000 with accessories. ORD will be supporting maintenance costs, and a computer consultant will be provided by CIRC.

V. INVITATION OF FOREIGN EXPERTS

A. Total of six (6) long term and one (1) short term consultants were assigned to the project during this reporting period. Consultant time totaled twenty (20) man months, for an accrued 53.1% progress rate against the specified 456-man month overall project total.

The system of inviting short term foreign consultants will be changed, effective 1978. The present system of "individual invitation" will be

VI. TEAM/DISCIPLINE QUARTERLY REPORTS

A. Barley/Wheat

A review was made of the experimental results obtained during the 1976-1977 barley/wheat cropping year. It was decided that future CIRC sponsored projects will be "national projects", involving numerous ORD institutions instead of just one. One such project was started during the quarter, "Survey, of barley and wheat producing farms." Additional proposals of national projects were received for consideration in the 1978 CIRC Barley/Wheat budget.

Continued planning was made for the Barley/Wheat CIRC training program to include advanced degrees, short term training and training programs in conjunction with international cooperation. Placement for 1978 spring and summer positions has been made for many of these proposed trainees. A finalized equipment list was prepared and is now under final review prior to being submitted for bid letting by OSROK. In order to reinforce the interdisciplinary concept of research within ORD, teams of barley and of wheat consultants have been invited to Korea to review these respective research projects. Currently responses to these invitations are being received.

Additional activities have included the continuing of the Barley/Wheat Scope report, and work on the foreign scientist research problem.

B. Biometrics

a. Direct Involvement

- 1) Pest Forecasting: Data files from daily records of 43 forecasting units on 5 major rice pests over a 12 year period were stored on magnetic tape, listed and checked. Climatic data

files were also made available by the Central Meteorological Office (CMO). Procedures for processing these data have been initiated. Pest forecasting strategies will be developed over the next year.

* Cooperating Institutions:

Research Statistics Division CMO
Government Computer Center
Ministry of General Affairs
Crop Protection Division, Technical
Dissemination Bureau, ORD
Entomology Division, Agricultural
Technology Institute (ATI), ORD
Computer Room, Research Bureau (RB), ORD
Crop Improvement Research Center (CIRC), ORD

2) Identifying Cold Tolerant Rice Cultivars:

Computerized data processing procedures were initiated on data from the Rice Cold Tolerance Nursery at Chuncheon, Kangwon Province. (This facility was set up in 1975-76 using CIRC funds.) Data evaluation procedures will be jointly developed by CIRC and the International Rice Research Institute (IRRI) based on analysis of the 1977 data.

Cooperating Institutions:

International Rice Research Institute
Rice Breeding Division, Suweon Crop Experiment
Station (CES), ORD
Computer Room, RB, ORD
CIRC, ORD

3) Testing Uniformity of Soybean Growth on Land Newly Assigned to Soybean Research:

Uniformity trials were completed in newly established soybean research areas at Suweon and Youngnam Crop Experiment Stations. Experiment was to form basis for sampling procedures to be used in soybean experiments. Initial findings presented at 1977 evaluation meetings.

C. Cropping Systems

Results of this year's field experiments provided useful additional information on suitability of various cropping patterns. On paddy, systems of spring potatoes with rice continue to give highest farmer income versus winter cereals and rice. On Suweon upland, winter grains/soybean systems work well, particularly with mechanized planting and harvesting to reduce labor demands. But upland systems with early spring sweet corn, potatoes or other vegetables give highest farmer incomes. Jeju experiments showed wide variability in crops according to elevation and pest control problems, but the system of winter rape following summer radish gave highest income, other than possibilities of several forages.

A test-demonstration of complete mechanized preparation and seeding winter grains on newly reclaimed upland, was conducted in cooperation with AIC, IAEU and the UK-Korea project. IAS soil surveys now indicate over 300,000 has. of similar potentially reclaimable uplands for cropping.

Two trainees left for six-month crop systems short courses at IRRI and CIMMYT, and arrangements completed for three more advanced degree candidates.

The machinery sections of IAEU, and FORDs made additional progress in mechanical harvesting of rice this autumn, with further refinement of their reaper attachment for power tillers, and more sidespread introduction of Japanese type reapers and binders now manufactured in Korea.

Such promotion of mechanical harvesting machinery for rice (and barley/wheat), accompanying their notable progress introducing and distributing

* Cooperating Institutions:

Upland Crops Division, Suweon CES, ORD
Upland Crops Division, Youngnam CES, ORD
Computer Room, RB, ORD
CIRC, ORD

b. Consultation

- 1) Analysis and sampling consultation was provided to the following ORD institutions in the last quarter of 1977:

Rice Cultivation, Division, Suweon CES
Barley Division, Wheat Institute
German-Korean Joint Grasslands Project,
Forage Crop Division, Livestock Experiment Station
Production Economist, RB
Horticulture Experiment Station
Sericulture Experiment Station

- 2) Consulted in the development of a rainfall probability program to be used at the Agricultural Development Corporation (World Bank project).

2. Equipment

Approval was given by USAID for the proprietary purchase of a Digital Equipment Corporation's PDP 11/70 timesharing computer system to operate under RSTS operating system supporting the CRISP statistical software package developed by ICRISAT. The system will support terminals at all Suweon based ORD institutes involved in the CIRC project.

(currently consisting of 50-60 records per farm).

- b. A program to perform three way analysis of variance on selected variables.
- c. A program to analyse major crop yields on a cropping pattern basis.

2) Survey

To provide detailed cropping pattern economic information a survey of farms cultivating selected recommended patterns will be conducted. Preparation of a farm survey form to illicit partial budgeting information was begun. The unique problem of the survey form is that it must be flexible enough to collect information on a number of different cropping patterns and must be designed for ease of data input for computer analysis

2. Barley/Wheat Survey

The Barley/Wheat Institute will conduct a survey of nearly 10,000 households to determine the present status of barley and wheat cultivation. The farm management office participated in formulating the questionnaire format and specifically economic questions. In addition we assisted in reducing the sample size from its originally planned scale of 35,000 households.

3. Agricultural Products Price Data

Profitability of crop cultivation varies greatly from year to year due to natural conditions and consequent product price variations. Data on monthly prices of major agricultural products were collected for the period 1960-1977 eventually to be used in sensitivity analysis of crop production economics information.

rice transplanting machines last spring, markedly reduces labor demands and enhances paddy double cropping opportunities.

For the first time Rice Production Division of CES extended winter rye planting on several hectares of paddy, and will gradually expand multiple cropping over their rice multiplication fields. Similar plans for multiple cropping summer crops on barley-wheat research fields were negotiated with DWI.

D. Economics

1. MAF Data Analysis

Every year the Ministry of Agriculture and Fisheries conducts a farm household economy record keeping survey throughout the country. The sample size was 2400 households in 1976 and 3600 in 1977. Since the information is collected three times a month, there is a good possibility of high reliability. Furthermore, since a wide range of economic variables is surveyed, there is a high potential for analysing interactions which affect multiple cropping intensity.

The summarized data from the 1976 survey was made available in November, and initial analysis was begun using the computer facilities at the Agricultural Development Corporation. After three weeks it was decided to use the computing facilities at the Economic Planning Board which had been recently expanded and offered higher speed and greater language flexibility.

Development of the following programs was begun:

- a. A program to aggregate the data to a 1 record per farm basis

7 reference books

90 agricultural reports in paper copy

504 agricultural reports in microfiche

6) Other activities

- a. The library's collection of publishers' catalogs has been reorganized and weeded.
- b. The library consultant and library administration have begun to work together on space, furniture, and personnel needs of the library in connection with CIRC purchases.

F. Plant Protection

1. Personnel changes were made the previous quarter, with the entomology consultant appointed project Co-Director. No additional entomology or plant pathology consultants served the current quarter.

2. Training placement was arranged for a Ph.D. candidate in entomology in the field of insect toxicology at the University of Missouri, starting next quarter. Provision was also made for dispatch of a M.S. degree candidate and several short-term trainees next year.

3. Research in varietal resistance to the brown planthopper (Nilaparvata lugens) was emphasized. A technique was developed for evaluation of feeding responses to determine susceptible and resistant rice varieties using seedlings subbed with phosphorus-32. The method allowed for the rapid screening of rice varieties, with quantitation of data. The technique is also adaptable

E. Library

The following are activities in the Office of Rural Development Library during the fourth quarter of 1977:

- 1) Training; One ORD librarian was sent for a three-month worksite experience training program at the National Agricultural Library in the United States.
- 2) Books Received; 4 books were received which had been ordered as special rush items from IIE.
- 3) Books and Journals Ordered; Initial lists were submitted to CIRC for books and Journals. However, since the original library budget has been considerably reduced, many of these items will probably be excused before the lists are submitted to IIE.

Books	3512 titles (4027 volumes)	\$87,500
Journal subscriptions (1978 -1982)	232 titles	\$69,000
Journal backfiles (pre-1978)	277 titles	\$193,500
		<hr/>
		\$350,000

- 4) Equipment Ordered; L/Com totalling \$88,000 have been requested from OSROK for library equipment.

5) Donations;

Arrangements have been made for the library to receive the following materials free of charge:

Several new varieties looked good in 1977. Development and multiplication of elite stocks of Superior has been approved by the National Seeds Council, but additional quality and yield data are needed before varietal release will be recommended. Shimabara, the recommended autumn crop variety, yields well in the alpine area and has good late blight resistance; therefore, further study on this variety was suggested. If its short dormancy can be controlled, Shimabara may be grown for the planned potato flake processing plant. The estimated consumption of the AFDC plant will be 200 MT of potatoes per day. Chungye No. 1 which has shorter dormancy and better quality than Shimabara may be useful as a autumn crop variety in northern and central areas.

- b. Research project results - Harvests from the delayed harvest trials at Undong, a potential new seed production area in southern alpine area, indicated that it is possible to grow sweet potato, Chinese cabbage or buckwheat after maturation of the potato crop. Potatoes and the following crop were harvested in late October. Potato tubers were in excellent condition and could presumably be stored until spring. Tubers harvested in July from the same field had long sprouts and could not be kept to the next spring. This makes production of Irish Cobbler seed in the southern alpine areas feasible. The Jeonbuk POSB is presently developing new seed production areas at Muju and Undong.

to other insect pest species, and will be utilized extensively next year. Tongil and Yushin rice varieties were found susceptible to the feeding of the brown planthopper, whereas Suweon 264, Mudgo, and IR747 varieties were found to be highly resistant. These results agree with previously established conventional screening methods.

Provision was made to obtain supplies of superior oils for evaluation against sucking pests (plant-and leafhoppers, mites, aphids, and thrips), control of resistant strains on several crops, and suppression of virus infection.

G. Potatoes

1. Research

- a. Program improvement - The discovery of potato spindle tuber viroid (PSTV) infection in elite seed stocks at the Alpine Experiment Station by Dr. H.M. Darling, CIMC consultant on seed potatoes, necessitated several changes in the normal seed potato production scheme. Dr. H.M. Darling's report outlined recommended changes and excellent progress was made in their implementation. Breeder's I and breeder's II seed fields are to be planted with foundation seed which has less than one percent PSTV. Clean Irish Cobbler seed is to be imported as single plant selections to replace the virus-free stock. Clonal selection, tuber unit plantings, and better sanitation will also be used to prevent reinfection of clean stocks.

and to his knowledge of recent research developments and training opportunities. (See the attached report).

3. Equipment and Books - Additional lists of suggested reference books were provided to the librarian. Laboratory and field equipment requests were updated and revised.
4. General - Local potato storage pits in the alpine area were examined and notes were taken on grading procedures prior to storage. The use of woven plastic bags for market potatoes in the alpine area has increased rapidly. Rice straw bags are still used for transport and storage of seed potatoes. An array of local cultivars including at least one red variety are still grown in the alpine area. Yield losses due to tuber rots prior to harvest were much lower this year than in 1976.

The supply of certified seed potatoes, about 7,000 metric tons, was less than 70 percent of the autumn demand for quality seed potatoes. The MSPD purchase price for seed potatoes was 10 to 15 percent below the price received for ware potatoes. Yield data at the Alpine Experiment Station indicates that the supply of seed for planting the 1978 crop will be very short. Since market prices for potatoes were good throughout 1977, more hectares of potatoes may be planted in 1978. As a result, the price of seed and market potatoes are expected to be extremely high during the March and April in 1978. Farmers who have not yet purchased seed for spring planting may be unable to do so later.

Results from the cooperative late blight trial at the Alpine Experiment Station were forwarded to CIP in Lima. Most cultivars had excellent late blight resistance, but they were too late to be useful in Korea.

- c. Future directions - Cyst nematodes were found in the isolation plot at the Alpine Experiment Station. The cysts were identified as Globodera pallia at CIP, but ability to attack of potatoes has not been confirmed. Thus, the identification of cyst nematode from the isolation plot is still open to question.

Notes were taken on reaction to frost injury and regrowth of potatoes four weeks after partial kill. Injury symptoms were similar to those observed last spring on Irish Cobbler at the Alpine Experiment Station. Germination of botanical seed and vigor of seedlings was better in a sand-burnt rice hull mixture than other media tested. A program for using 4x-2x crossing to obtain early, highly yield seedling progenies was developed and implemented with cooperation from Dr. H.Y. Kim, Dongkuk University, Seoul.

2. Training - Two Korean scientists were sent to CIP in Lima for 4 months of training in potato physiology and breeding. Admission of three Korean scientists to Ph.D. Programs in graduate schools at U.S. degree candidate is still being processed. Short term training and conferences were planned for several other potato scientists.

The potato team leader attended the annual internal review at CIP to

698 mt/ha. The cooperative Korea/IRRI effort in recent years have produced superior lines, making this result possible. New improved varieties are already in multiplication. Emphasis in reearch programs will continue to focus on yields and: cold tolerance, earliness, and pest and disease resistance. Cooperative Korea/IRRI research programs were established in 1978 for areas of : 1) cold tolerance, 2) disease and pest resistance, 3) natural enemies (biological control), and 4) chemical control.

I. SOYBEANS

1. Personnel on this team were short this quarter. The previous Soybean Team Leader, Dr. John M. Yohé, serves as Acting Co-Director before his departure from Korea on 1 July. A search was conducted for a replacement. One of the expatriot staff for AVFC was being considered for the soybean team leader position, but this arrangement did not materialize. A total of five (5) candidates are being considered for this vacated position. Final selection of the soybean team leader will be made next quarter.

2. Training reports received of candidates in Ph.D. and M.S. training in two universities in the States were most favorable. The Co-Director visited trainees at the University of Illinois and was pleased with their progress, and also with reports from their major professors. Plans were made to invite two of the students' professors to Korea as short-term consultants. This proposal will foster further understanding of country conditions and needs, and assist in developing most effective research programs.

H. Rice

1. Personnel serving for part-time this quarter included Dr. H.M. Beachell, who will be returning to Korea the second quarter of 1978. Mr. Marvin D. Davis, the former rice team leader was appointed Director the Sri Lankan program the previous quarter.

A significant development this quarter was the joint meeting of Korea and IRRI researchers in the Philippines in December. A total of nine (9) Korean scientists met with counterparts in similar fields from IRRI to establish cooperative programs for the 1978 season. Among these programs is the expansion of test for cold tolerance at Chuncheon. IRRI will provide one full-time staff member for experiments with Korean counterpart staff. Consultancies of additional IRRI staff in the various disciplines were also arranged for next year. This provide for continued appraisal of current and future rice problems, and ensure continued progress in rice production in Korea.

2. Training provisions for the balance of the students in the rice program were finalized, with dispatch next quarter. This will include two (2) Ph.D. candidates, two (2) M.S. candidates, fifteen (15) short-trainees, and five (5) international conference attendees. Due to English requirements (passage of the IATT test), there is a possibility that not all short-term trainees will be sent abroad.

3. Research success in rice production continued, and has assisted the national program in obtaining self-sufficiency for the second consecutive year. An all-time record yield was obtained in the Republic this season,

3. Research recommendations from two consultants, a breeder and an entomologist, the previous quarter were received. The breeder focused on: 1) virus problems and necessity for breeding resistant lines, 2) adoption of smaller-seeded varieties with faster germination and yields equal to larger-seeded lines, 3) mechanized planting, 4) use of Japanese brachytic types on levees, 5) varieties with higher protein content for direct human consumption, 6) necessity of earlier-maturing varieties or cultural practices permitting use of later-maturing varieties, and 7) with increasing rice yields in the Republic, consider planting of soybeans on some of more productive paddy lands.

Recommendations of the entomologist from INTSOY dealt with training, research facilities, flow of information, and required research programs. In comparison with the importance of soybeans in the country, there is a disproportionately small group of technical personnel working on this crop. More extensive training of additional personnel is required, along with research equipment and rearing facilities. The four types of pest complexes or types of injury are: 1) aphid injury to plants by direct feeding or serving as vectors---considered the principal problem with soybeans in Korea, 2) the soybean pod borer (Glycinivorella leguminivora), 3) roots and lower stem feeders (white grubs and wireworms), and 4) leaf defoliators (principally the false looper).

VII. FINANCIAL STATUS

A. Dollar fund expenditures are given in TABLE VII for the fourth quarter 1977, and also included in the cumulative totals. Highest expenditures this quarter were for invitation of long- and short-term experts (\$93,000), followed by overseas training (\$66,000), and administrative fees for IIE (\$9,000)--- total of \$168,000. With purchase of equipment and delivery next quarter, over half the loan funds will be utilized.

B. Won expenditures are given in TABLE VIII for the last quarter of 1977. Expenditures amounted to 178,000 Won, and are included in the cumulative total, 1,176,000 Won or 74% of agreed expenditures.

TABLE VIII

STATUS OF WON BUDGET

Project	FOURTH QUARTER (Oct.77-Dec.77)	CUMULATIVE (Aug.74-Dec.77)	GRAND TOTAL	
	Expenses	Expenses	Budget	Expenses
Salary for supplementary personnel	37	263	433	263
Research work	17	286	344	286
Research facility	15	310	370	310
Tuition for foreign children	-	1	1	1
Housing for foreigners	4	149	164	149
Operation of CIRC	5	147	167	147
Customs Clearance	1	5	65	5
Interest	5	15	50	15
Total	84	1,176	1,594	1,176

TABLE VII

STATUS OF ICAIN FUNDS

Unit : 1000\$

Project	FOURTH QUARTER (Oct.77-Dec.77)	CUMULATIVE : (Oct,77-Dec.77)	GRAND TOTAL	
	Expenses	Expenses	Budget	Expenses
1. <u>Invitation of Foreign Experts</u>	<u>93</u>	<u>826</u>	<u>1,306</u>	<u>826</u>
Long term experts	70	674	994	674
Short term consultants	23	152	312	152
2. <u>Overseas Training</u>	<u>66</u>	<u>356</u>	<u>1,593</u>	<u>356</u>
Degree course	33	170	1,055	170
Short term training	28	99	386	99
Conference/observation	5	87	152	87
3. <u>Imports of Res. Material</u>	<u>-</u>	<u>43</u>	<u>1,925</u>	<u>43</u>
Res. literatures, books	-	-	288	-
Equipment/instrument	-	20	1,578	20
Res. material	-	23	59	23
4. <u>Other</u>	<u>9</u>	<u>58</u>	<u>176</u>	<u>58</u>
Administrative fees for IIE	9	56	151	56
Service charges for banks	-	3	5	3
Reserve fund	-	-	20	-
<u>TOTAL</u>	<u>168</u>	<u>1,283</u>	<u>5,000</u>	<u>1,283</u>