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AGENCY FOR AGRICULTURAL RESEARCH AND DEVELOPMENT

RMI

FIFTH QUARTERLY NARRATIVE REPORT ON THE APPLIED AGRICULTURAL RESEARCH PROJECT

FOR THE MONTHS
OF
APRIL, MAY, JUNE
1983

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NARRATIVE REPORT ON THE APPLIED AGRICULTURAL RESEARCH PROJECT

FOR

April, May, June, 1983

I. Introduction

Since our technical assistance has been underway for 15 months it may be an appropriate time to review the AARP/RMI's efforts on the transfer of knowledge to the staff of AARD. When the project was first initiated, the role of the Experts was stated as follows :

> In this project the main objective of the experts is to assist in developing the research capacity of the Indonesian staff at the research institutes. Thus, the experts' role is to transfer their knowledge based on their academic training and research experience to the staff. To accomplish this RMI experts will be involved in training of the staff, advising on equipment and station design, and assisting the Indonesian staff in conducting their research. It is not the role of the experts to do their own research nor is it their role to recommend projects. Only when requested by the institute will they initiate any research and then it must have a large training component. In general these experts will carry out the following activities :
>
> - Develop and participate in conducting in-service training programs at the institute to include actual seminars, lectures, and workshop.

- Assist the Indonesian staff carry out their research projects.
- Assist in laboratory equipment selection.
- Assist in library development.
- Make available information on suitable training programs.
- Assist candidates for advanced degree training in Indonesia or abroad to develop appropriate academic programs and research topics.

In order to ensure that each of the RMI experts is deeply in training at their location, each expert will be required to develop a training syllabus which should include :

1. Weekly lectures at the institute
2. Periodic workshops
3. Frequent seminars
4. Participate (if requested) in "on-going" research of the institutes' staff
5. Development of new research projects (if requested by the directors of the institute) that have a major training component.

The purposes of this Quarterly Report will be to report on our activities during this three months period and to provide a special emphasis on the experts'role at the institutes and their efforts to transfer knowledge to the staff of AARD. Thus, it is an effort to compare what has been done in this quarter with what was suggested at the beginning of the technical assistance component of this project.

II. PERSONNEL

Before discussing the staff's training activities, a review of the 23 positions in the project may be useful, including information on who has filled the position or when it is scheduled to be filled.

		Length of Assignment
1. Chief-of-Party AARP	- William L. Collier	3½ years April 1982-Sept. 1985
2. Administrative Specialist AARP	- Carl R. Fritz	2 years May 1983-June 1984. The Chief-of-Party has recommended this position be extended until September 1985.

3. Farming Systems Specialist Bogor Research Institute Food Crops (BORIF)	- Jerry L. McIntosh	2 years July 1982 - August 1984. This position was originally for an agricultural economist but the terms of referrence was changed to farming systems specialist. This position was subcontracted to the International Rice Research Institute.
4. Tuber Crops Post Harvest Processing Specialist (BORIF)	- Diane M. Barrett	2 years April 1983 - May 1985. This position was originally for a tuber crops breeder but the terms of reference was changed to post harvest processing.
5. Research Station Development Specialist	- Roland E. Harwood	2 years Sept. 1982 - October 1984. This position was not included in the original project paper but was added during the negotiations for the contract.
6. Soil Scientist Maros Research Institute for Food Crops (MORIF)	- Igmidio T. Corpuz	3 years July 1982 - July 1985.

7. Plant Pathologist MOR IF	- Anwar Rizvi	2 years January 83 - Feb. 85 In the Project Paper this was a plant protection specialist with emphasis on entomology. The terms of referrence were changed to a plant pathologist.
8. Agricultural Economist MOR IF	- Fritz von Fleckenstein	33 months January 83 - Sept. 85
9. Rice Breeder Banjarmasin Research Institute for Food Crops (BAR IF)	- Kevitt Brown	2 years January 83 - January 85
10. Pest Management Specialist (BAR IF)	- Bernardo Gabriel (will arrive July 1)	2 years July 83 - July 85
11. Soil Scientist BAR IF	- not yet filled	John Bolton was hired for this position but he resigned after one month in Banjarmasin. The project is looking for a replacement.
12. Social Scientist BAR IF	- Greta Watson	2 years March 83 - April 85 This position was originally for an agricultural economist but was revised to be a social scientist.

13. <u>Fish Nutritionist</u> Research Institute for Inland Fisheries (RIIF)	- Chhorn Lim	2 years May 83 - June 85 In the Project Paper, this position was planned for the substation at Gondol, Bali. Since this station will not be finished for at least one year, it was decided that the position would be with RIIF in Bogor for at least the first and possibly both years.
14. <u>Fish Breeding Specialist</u> RIIF	- William Vanstone (will arrive in September 1983)	2 years Sept. 83 - Oct. 85. In the Project Paper, this position was also planned to be at the substation in Gondol, Bali. Since the station is not finished, he will be stationed at RIIF in Bogor for the first year.
15. <u>Animal Pathologist</u> Research Institute for Animal Disease (RIAD)	- not yet filled	2 years This position was scheduled for Sept. 1983 and to be located at a substation in Banjarmasin, Kalimantan. The construction of the station has not yet begun. It may be that this position

		will be changed to a large animal breeder and stationed in Bogor.
16. Parasitologist RIAD	- not yet filled	2 years This position was sceduled to begin in September 1983 and to be at the substation in Banjarbaru, but construction is not yet planned. This position may be cancelled.
17. Pasture Agronomist Research Institute for Animal Production (RIAP)	- not yet filled	2 years This position is scheduled to begin in September 1983 and to be located at a substation near Kupang, NTT. The station's construction has been delayed and this position may be cancelled.
18. Tropical Forest Silviculturist Forest Research Institute (FORI)	- not yet filled	2 years This position is scheduled for September 1983 at the Samarinda substation which has not yet been built. The plan is to move this position to Bogor for the first year and then Samarinda. It hoped that this position can be filled between January and April 1984.

18. Tropical Forest Silviculturist Forest Research Institute (FORI)	- not yet filled	2 years. This position scheduled for September 1983 at the Samarinda substation which has not yet been built. The plan is to move this position to Bogor for the first year and then Samarinda. It hoped that this position can be filled between January and April 1984.
19. Tropical Forest Soil Scientist (FORI)	- not yet filled	2 years. The situation is the same as number 18.
20. Forest Engineer (FORI)	- not yet filled	2 years. The situation is the same as number 18.
21. Forest Economist Forest Products Research Institute (FPRI)	- not yet filled	2 years. The situation is the same as number 18.
22. Tropical Forest Silviculturist (FORI)	- not yet filled	2 years This position is located at the Maros substation which has not yet been built. This position would be the first year in Bogor and possibly the rest of the time in Maros.

23.	Savannah Silviculturist	- not yet filled	2 years. This position was scheduled for Sept 1983 at a substati near Kupang. This position may be cancelled.

During the mid-term evaluation which will take place in October, these unfilled positions will be reviewed and perhaps the terms of the referrence will be revised. By the month of July with the arrival of Bernando Gabriel, there will only be two unfilled position of the 14 which in the Project Paper were planned to be filled in July 1983. One position is the fish breeder position which will be filled by Dr. Vanstone in September 1983 and the Soil Scientist position that was vacated by the resignation of Dr. John Bolton. Although the planned technical assistance has been reasonably on schedule by the end of this quarter in June, beginning in September it will be seriously behind according to the project paper though it is due to the understandable delay in construction of three research stations.

III. STAFF ACTIVITIES

1. William L. Collier, during this three month period has assisted AARD in preparing proposals for funding of research which were submitted to the World Bank. The first one was on rainfed agriculture in NTT and NTB and the second was concerned with research on agriculture in the swampy lands of Indonesia. This second proposal

has reached the point that negotiations between the Bank and BAPPENAS will begin in early November. Since the Banjarmasin Research Institute for Food Crops will be the lead institution in the swamps research, Dr. Collier's assistance is directly helping one of the institutes in the AARP.

He worked with Dr. Ibrahim Manwan in developing the project on "Sustainable Intensification of Agriculture" which will encourage research by providing grants to scientists in universities, government institutions, and foundations. This project is sponsored by AARD and receives support from the Ford Foundation and USAID. For the next activity of this project, a workshop in South Kalimantan on "Sustainable Intensification of Agriculture in Tidal Swamps" will be held in July. Dr. Collier made several trips to Banjarmasin to help in the preparations for the workshop.

In June the Fruit Crops Seminar was held in Jakarta. AARD sponsored this activity with support from a German Foundation. Dr. Collier assisted Dr. Manwan and Ir. Paransih Isbagio in preparing for this Seminar.

A review of the AARP by the Director General was held in June. Dr. Collier assisted Mr. Achmad Abdullah, the Team Leader, in development of the report for the review. After this review was completed, a recommendation was made to USAID on revising the funding proportions on construction in the AARP.

The decision on this request will have a substantial impact on the construction program.

2. Carl R. Fritz, Administrative Specialist, was deeply involved in the financial and administrative activities of the RMI portion of the AARP. Besides this he is managing the short term training program for AARP. The varied nature of his job keeps him on the move. He generally spends most mornings at AARD headquarters in Pasar Minggu, South Jakarta, where he works on training matters, translates project reports and prepares letters in English. Toward noon he goes to the RMI office in Kebayoran where he obtains and sends telexes and works with Mr. Sulaeman and other RMI staff on administration and financial matters. RMI is also a convenient place to make telephone calls, as the RMI office is better endowed with telecommunications equipment. On Saturdays he generally works at Bogor, and often needs to attend meetings there one or two other days during the week. During this quarter most of his administrative concern involved helping new AARP/ RMI specialists to get settled in Indonesia. Some shipping and customs clearance problems continued from the previous quarter, but most of them were completed by the end of June. During June, Pak Sadikin, AARD Director General, asked Mr. Fritz to join him, other AARD officers and Dr. Ralph Retzlaff of IADS on a trip to Manado. Mr. Sadikin and the others visited Manado to arrange for a change in director

at the Manado Research Institute for Industrial Crops. Dr. Retzlaff and Mr. Fritz were there to get a general feel of the activities of the Institute and training requirements. The national function of this institute is to conduct research on coconuts. There is concern that Indonesia is the second largest coconut producer in the world, but that it has failed to maintain a good quality and that its research organization for coconuts does not match those of countries producing lesser quantities. The Institute has ambitious plans for training researchers to M.S. and Ph.D level. One observation he made while visiting the Institute and the various related substations is that the lab researchers are predominantly women. This may make it difficult for many of them to pursue long term academic training because of their families. They may find it more possible to take specialized short term training. He will be studying the Institute's plans over the next couple of months.

3. James Myers, part-time Training Coordinator based in Jakarta, assisted Mr. Fritz in making arrangements for training and departure of participants. Mr. Walter Flinn who is AARP/RMI's part-time Training Coordinator based in Washington, D.C., contacted various institutions to support participants who are already in programs and to make arrangements for those who are scheduled to arrive.

4. Roland E. Harwood, Research Station Development Specialist, assisted in the substantial progress made in preparations for the planned construction. During this quarter the construction plans for Banjarbaru and Maros, Phase I, and Bogor, Packet I, Phase II were completed and these plans have been approved by USAID. To do this, AARP received invaluable assistance from the USAID engineers who worked long and hard to help in checking and correcting these plans. The experience gained by the architectural and engineering firms contracted by the AARP, working together with the USAID engineers, is a valuable bi-product of the AARP agricultural program.

Experience gained in the last few months should made it possible to finish the construction plans for the year 1983-1984 much more rapidly.

He is actively following the construction of the auditorium in Bogor where there still are some problems delaying completion.

His other major responsibility is helping prepare the specifications of equipment for procurement. This activity takes substantial time and he expects to have the first order completed in September.

5. Diane M. Barrett, Tuber Crops Postharvest Processing Specialist, arrived April 1 to begin a two year assignment with the Bogor Research Institutes of Food Crops and its substation in Karawang. She will divide her time between Bogor and Karawang, assisting both in training and carrying out research on tuber crops. She has a B.Sc. degree in Food Science from the University of California at Davis and an M.Sc. degree in Food Chemistry from the University of Wisconsin at Madison. In 1982 she was a nutrition consultant for USAID to the Department of Community Nutrition and Family Resources at the Bogor Agricultural University. During 1981 she was a World Bank consultant to the Food Technology Development Center at the Bogor Agricultural University. She was involved in research on production of flour from fermented tuber crops for use in weaning food mixtures; examining the advantages of sun-drying of tubers us drying; design of small scale equipment for milling, slicing tubers, grinding, roosting legumes, and separating hulls from soybeans. In order to become acquainted with their activity, she met the staff involved with this type of research, and gathered information on the history of postharvest technology (with emphasis on tubers) in AARD, current research activities and facilities, farm level and industrial level operations. She has initiated weekly seminars and discussion in research methodology in conjunction with

the Karawang staff. She participated in the Karawang Station's one week review of research proposals on rice, corn, soybean and cassava. In preparation for AARD'S meeting on Collaborative Research with the Australian Center for International Agricultural Research, a team composed of Dr. B.H. Siwi, Ir. Soemardi, Ir. Rumiati and Ms. Barrett developed seven terms of referrence on grain storage. She has also been invited to participate in several of their research activities (See Appendix I). She also visited Lampung with AARD staff to inspect cassava processing and production (Appendix I D). As one of her first major activities, she actively participated in AARD's "International Workshop on Promotion Research on Tropical Fruits" held from June 4 to 7, 1983. She is presently involved in helping to edit the proceedings.

6. Chhorn Lim, Milkfish Nutritionist, arrived for a two year assignment at the Bogor Research Institute for Inland Fisheries in late May. His considerable activity of the past five weeks is reflected in his activity report found at Appendix II which include attachements on his trip to the Pasar Minggu Substation (Appendix II.A) trip to the Depok Substation (II.B), Recommendation of the Quality Control of Fish Feed (II.C), and Outline of Lecture/Seminar Program on Fish Nutrition and Aquaculture (II.D).

7. Jerry McIntosh, IRRI Farming Systems Specialist at the Bogor Research Institute for Food Crops, spent most of April and part of May assisting 15 scientists plus GOI and USAID officials on an Upper River Watershed Assessment for which he prepared two reports. He also assisted AARD staff in preparing a proposal for Corp/Livestock Research, visited BARIF to evaluate candidates for IRRI training and visited South Sumatra to participate in planning Farming Systems Research and Development activities. One of his principal activities during June was to prepare a paper and participate in the Sixth Cropping Systems Workshop June 20-21. For other June activities, see Appendix III.

8. Fritz von Fleckenstein, Agricultural Economist at the Maros Research Institute for Food Crops (MORIF) made an observation and analysis of field work techniques in the Agricultural Economics department; initiated intensive data collection from whole farms in Baju Bodoa near Maros as a methodological and training exercise; began drafting a whole-farm questionnaire precode for future questionnaires; began preparation for the implementation of the PATANAS (Panel Tani Nasional) programme in South in South Sulawesi; and prepared specifications for the MORIF microcomputer system. He also continued to oversee the Petty Cash account with the able help of Mr. Nurdin Salam (Appendix IV).

9. I.T. Corpuz, Soil Scientist at MORIF wrote a paper on the residual effect of three sources of nitrogen at three rates of application, presented a research proposal on Azolla as a nitrogen source for rice, helped initiate the project, participated in the generation of experimental data from a number of completed projects, and conducted informal training for professional staff and field technicians in the implementation of research projects. (Appendix V)

10. S. Anwar Rizvi. Plant Pathologist at MORIF provided training to various Maros staff members in the application and adaption of spray-bottle innoculation technique for rice blast nursery screening experiments, form and structure of plant viruses, review of literature on chemical control of plant viruses, purification of plant viruses, organization and cataloguing of chemicals in the plant pathology laboratory, and assistance in writing up a draft research paper in English on the control of Rice Tungro Virus (RTV).

    He also participated in monitoring of RTV nursery screening experiments and helped to generate data and prepare it for presentation, proposed a new experimental design for RTV nursery field experiments, which was accepted and will be implemented in the first semester of the 1983/1984 research year, and presented three other research proposals for investigation of particular problems. (Appendix VI).

11. John Bolton, Soil Scientist at the Banjarmasin Research Institute for Food Crops (BARIF) resigned during this quarter after being at his post for only a few days. He made one contribution to the project which was to revise the specifications of the procurement list for laboratory and field equipment.

12. Greta Watson, Social Scientist at BARIF, was deeply involved in organizing, designing, coordinating and implementing the pre-surveys and pre-survey reports for the upcoming tidal

swamp workshop. The results of this effort will be seen in July meeting, but also will include a monograph on tidal swamp agriculture at the village level plus a considerable amount of training in agro-economic methods in the office and in the field. Two seminars and three training seminars were also given. Ms. Watson also helped in the writing of various publications and proposals with BARIF staff and visited several research sub-stations (See Appendix VII).

13. Kevitt D. Brown, rice breeder at BARIF, held discussions with his counterpart to improve the plant breeding program. Several research stations were visited and improvements in research and facilities were recommended. He also visited Bogor and Sukamandi to improve cooperation with these BALITTAN stations. A plant breeding monthly meeting, a silica gel seed storage system, and a rice crossing program were also initiated. Mr. Brown also served as Acting Head of Party and was in charge of RMI accounting (See Appendix VIII).

IV. SHORT-TERM

TRAINING ABROAD

During this quarter only five AARP participants departed for short term training abroad. Dr. Purwito, Director of the Research Institute for Marine Fisheries, joined a group of participants from the Indonesian Institute of Science (LIPI), the National Institute for Administration (LAN) and two universities in a training program in R & D Management Consultancy Services at the Denver Research Institute May 22 - July 1, 1983.

In early June two officers from the National Library for Agricultural Sciences, one from the Marine Fisheries Research Institute and one from the Central Research Institute for Fisheries joined a special four week program in library and research information management at the International Center for Living Aquatic Resources Management at Manila.

Six participants returned from foreign training during the quarter. In early April Mr. Kosasi Kadir of the Forest Products Research Institute in Bogor completed his one month program in coconut woodworking and drying and research project planning and evaluation at the Forest Products R & D Institute in the Philippines. In May the four member interdisciplinary vegetable breeding team from the Lembang Research Institute for Horticulture (LERIH) returned from a six month training program at the Asian Vegetable R & D Center in Taiwan. Finally, in June Mrs. Ati Srie Duriat returned from her three and a half month program in the Elisa technique for detecting potato virus at the American Type Culture Collection and USDA.

During July we expect to send six researchers from Maros, Gondol, Kamal and Depok to Taiwan to pursue a two month program in brackish water aquaculture. In August we plan to send two agricultural economists from MORIF to FARMAP, a three week training program in farm analysis conducted at the Regional Computer Center of the Asian Institute of Technology, Bangkok, and a researcher from BARIF to IRRI for a three month program in integrated pest management.

As of the end of June 1983, fifty AARP participants had completed 101.3 person months of short term training abroa Forty-six of them completed 95.1 person months of training und the RMI contract (See Appendix IX).

For this quarterly report we have included in Appendix X a translation of a summary report produced by the Interdisciplinary Vegetable Breeding Team of four scientists from the Lembang Research Institute for Horticulture which trained at the Asian Vegetable Research and Development Center in Taiw November 1982 - May 1985. Copies of the individual reports (all written in English) may be obtained by addressing a reque to Carl Fritz, AARP/RMI Administrative Specialist.

The short term training procedures and how the program is managed are an important part of the AARP/RMI program. Mr. Fritz has described it in the following manner. The Project has collected substantial material on the availability of short term training opportunities in the US and the developing world, but I feel a real need to set aside time in which to bring up to date the "Summary of Short Training Programs Available for AARP participants in 1983 - 1984" which was issued in August 1982.

The Project has had a very large "master" list of participant candidates since the beginning of the year. From time to times names are dropped out of added as a result of

communications from the participating research institutes.

During the past two quarters there has been somewhat of a lull in actual sending of participants abroad as we awaited data being provided by AARD institutes for the manpower training study. After the Director General's review of project progress in June, however, it can be expected that training activity will accelerate considerably in coming months.

Preliminary judgments on participant candidacies are usually based on forms filled out by the candidates in Bahasa Indonesia which are submitted to AARD's Commission on Manpower Development. If the Project Leader decides that a particular candidate should be given a chance, he or she is asked to take the ALIGU English language test generally given twice weekly by USAID in Jakarta, twice yearly in Banjarmasin and Maros and at intervals in other locations. If the candidate passes the test, or we have reason to believe that the person can absorb the training in question, he is asked to fill out forms required by USAID and for some training institutions their own special application form.

Usually candidates are reluctant to put much information in these forms, and the result is something that USAID cannot accept. It would be helpful if AARP/RMI specialists would assist candidates at their locations in completing these forms.

As it is, I review all the information available on the person and the desired training program, then rewrite the material trying to put myself in the shoes of the applicant. After these are signed and returned by the candidate, I prepare for the Project Leader's signature a letter requesting USAID concurrence. At RMI I send a telex to Mr. Flinn in RMI, Washington or to a training institution in a developing country asking that the candidate be registered in a particular program.

After USAID concurrence is received, the Project may begin processing the participant for departure. Clearances are needed from the Secretary General of the Ministry, BAPPENAS and SEKKAB, passport must be issued, visas obtained and medical exams taken. Three weeks should be allowed for this process, though it sometimes has taken less.

The process is seldom as straight foward as indicated above. In some cases we have to investigate when a particular type of training can be given. Sometimes we ask institutions to make a proposal. All of this takes time.

In some other cases the sending institution is in communication with the training institution long before AARP headquarters knows anything about it. Sometimes the training institution has arranged for conducting a special program, and has reason to believe that a group of participants is committed to arrive on a schedule which is impossible to keep.

Once official clearances have begun I send participants a letter notifying them of their training program and expected date of departure and requesting them to call at RMI in Jakarta. Usually two visits are required. On the first visit, I ask them to fill out applications for travelers checks. On the second visit, Mr. Myers and I furnish them their advance maintenance allowance and airplane tickets, and Mr. Myers explains their air routing. In one recent case, the clearance process was delayed, and some participants came to Jakarta/Bogor prematurely after getting my letter.

For most participants going to the U.S., we endeavor to have them spend one week at the Washington International Center (WIC) for orientation purposes. If the training program has been arranged by USDA, the cost of orientation will be within the USDA training fee. Otherwise, RMI pays WIC separately. WIC also endeavors to meet incoming participants at the airport. This service is performed by volunteers, however, and on occasion our participants were not met.

As soon as we have confirmed air travel reservations, we telex Mr. Flinn in RMI Washington, giving him the arrival flight and time and instructions regarding payment of training fees and further maintenance allowance. In the case of some institutions like IRRI, AVRDC and CIMMYT, we telex arrival information directly to the institution. We pay IRRI and AVRDC upon presentation of an invoice. In some other cases in Southeast Asia, we have to provide funds in advance as some

institutions do not have special funds to carry them through major training expenditures.

Though there have been problems, the participant program has on the whole worked out very well. One recently returned participant from the US reported that RMI had done a good job in making all arrangements and that during the long trip back and forth and three months in the US she had never felt alone or a stranger in a foreign land. On the other hand, a team of four researchers returning from Taiwan suggested that for sending trainees in the future they should know the program and training schedule before departing.

7. AARP Training Activities at the Institutes

As an example of what the AARP training is like, at the Maros Research Institute for Food Crops the experts have been involved in the following four activities:

1. Seminar series.

   A series of seminars or talks will be begun in the coming quarter. Some tentative topics are shown in Dr. Corpuz's and Dr. von Fleckenstein's reports. Dr. Rizvi has already begun the new quarter with a talk on the Latex Test, a cheap, easy, improved serological test for identifying viruses, and he has plans for other talks on other types

of serological tests and other related topics. The RMI staff will soon meet to discuss the way in which we can coordinate these talks: on some subjects, two or more of us have a common interest.

2. Informal education and training.

   All of us have found that training is most useful when imparted informally; seminars may serve to give attention to a particular subject, but learning really occurs when the student is actively involved in a process. We all intend to continue this informal training, as noted in the individual reports. See also the special report on training activities by Dr. I.T. Corpuz.

3. On-going research.

   This is the vehicle for informal training, besides giving benefits in and of itself. We are all involved in on-going research, which is described in the individual reports.

4. Computer training.

   A new form of training, which will take place in the coming quarter, is training in the use of microcomputers. This will involve both formal talks and informal hands-on practice for staff members.

Dr. Corpuz, the Soil Scientist at Maros carried out research training in the research projects in which he is involved. He reported the following:

There was no formal training program so far that was initiated. The training responsibilities executed were all informal in character. These are all related to the implementation of research projects from site identification and selection to experimental data generation. The training activities were mainly done where the research projects were established. These were made possible by undertaking field trips to the sites. Professional staff members and field technicians were involved in the training activities.

The guiding principle in this type of training is that the transfer of knowledge is more lasting when the person actively participates in a given activity. This transfer of knowledge can best be achieved in the field where the activities are made. One will not be talking of abstract things but with concrete things. As a final output staff members in Soil and Agronomy can do a better job a generating meaningful research results by soiling their hands and feet and not just wait in their offices for the results of experiments submitted to them by the field technicians.

Some specific activities where transfer of knowledge were succesfully achieved include the following:

1. In establishing field plots.

   a. Lowland condition.

   There is the need to construct bunds or dikes around each plot. Most often the soil used to establish the bunds are taken from the plot itself within the area where the bunds are being constructed. This procedure creates an uneven field plot land surface. This situation could hardly be noticed when there is standing water at the time the plots are being established. The uneven land surface contributes to serious variability of experimental results. Before fertilizer application and transplanting there is the need to first level the field plot land surface. This can be achieved very easily using no special tool.

   b. Upland condition.

   There is the need to construct channels around each plot to prevent surface runoff from flowing from plot to plot. This is very critical in fertilizer differential trials.

2. In designing an experiment to solve a local problem.

   There was a case where the principle of fertility gradient cannot be followed. The soil variability follows no definite pattern. A clasical field fertilizer trial was established earlier using a randomized complete block design.

Within a treatment in any replication was never uniform. The usual classical design was not application. A special blocking design had to be introduced and it worked beautifully.

3. Generating plot yield data partially damaged.

Damages due to rats were not uncommon. These brought about high coefficient of variation which makes one little cautious in arriving at valid conclusions from results obtained.

Most often when harvesting is left to field technician they follow instructions to the letter. This presents no problem under normal and good stand of crop. However where there are damages corrections have to be made. The common practice is by estimating the damage. The estimate is presented quantitatively. How it is obtained however is done qualitatively. The estimate may actually lead to another source of variation. A technique was introduced to correct the damage right in the field. A paper "Correcting Yield Partially Damaged by Animals" was written and presented during the 1983 INSFFER Site Monitoring Tour.

4. Generating unnecessary experimental data.

In the processing of rice yield harvest weights of unclean and clean grains were usually taken. There is no reason why the weight of the unclean grains should be taken.

5. Transformation of yield data.

It is a common practice to convert plot yield data to hectare yield data before statistically analyzing the data. Likewise percent yield decrease or increase had been used. It is better to statistifically analyze the data not transformed.

At the Banjarmasin Research Institute for Food Crops, the AARP/RMI team were involved in the following training:

A. Discussions with counterpart and plant breeding staff
   1. Daily field visits and discussions
   2. Irregular research station visits, experimental planning and progress.

B. Monthly meetings
   1. Rice breeding meetings
   2. Secondary crops meetings

   } round table discussions to improve research and research communication

C. Formal Seminars - could be done on weekly basis
   1. Given by consultants for information and methodology transfer
   2. Given by researchers about their experiments or literature surveyed.

D. Formal in-field training - irregular timing
   1. Demonstration of significant findings and methods for data collection.
   2. Crossing program training.

E. Informal discussions with researchers - to follow up on their research problems and ideas - irregular timing.

F. Training Manual for Field Data Collectors - will publish a simple manual describing how to collect plant breeding, agronomy, entomology, and pathology data to standardize the program.

Thus, the two groups of AARP/RMI Experts have begun to transfer knowledge to the staff of the two Institutes.

APPENDIX I

QUARTERLY ACTIVITY REPORT

By DIANE BARRETT

TUBER CROPS POSTHARVEST PROCESSING SPECIALIST

I. Principles Activities and Accomplishments

A. Organizational

1. Background information-gathering on the history of postharvest technology (with emphasis on tubers) in AARD, current research activities and facilities, farm level and industrial-level operations and areas most needing research.

2. Delineation of my activities at BPTP - Karawang, as elaborated on in Appendix IA.

3. Preparation of a Terms of Reference for a "Postharvest Evaluation Study" to assess the current situation with reference to postharvest research within AARD and to recommend restructuring if necessary.

B. Training

1. Formulated a schedule for weekly seminars/discussions and laboratories in the area of Research Methodology in conjuntion with the BPTP - Karawang staff, based on foreseen needs. A more detailed discussion of these seminars appears in Appendix IB.

2. Specialized training in the area of Tuber Crops Research will be implemented through joint research projects undertaken by the consultant and appropriate BPTP - Karawang staff, i.e. Ir. Soeharmadi, Ir. Sudaryono and Ir. Suismono (See discussion of research below).

3. Contacted Dr. Ernesto Lucas (USAID-Jakarta) and Dr. Robert Julian (Postharvest Institute for Perishables) concerning a USAID-sponsored 2 week training program on tuber crops to be given in September, 1983.

C. Research

1. Assessed past research activities, particularly in the area of cassava, at BPTP - Karawang.
2. Inspected research facilities available in the way of manpower, equipment and budget.
3. In conjunction with Ir. Soeharmadi and Ir. Suismono wrote preliminary proposals for the following research projects to take place in 1983/1984:

a). Influence of length of fresh storage of cassava on yield and quality of tapioca strarch

b). Methods of storing tapioca starch.

4. Participated in one week of intensive discussion with BPTP - Karawang staff concerning 1983/84 research project proposals for rice, corn, soybeans and cassava (see Appendix IC).

5. Worked together with Dr. B.H. Siwi, Ir. Soemardi and Ir. Rumiati in preparation of 7 Terms of Reference for ACIAR - AARD Collaborative Research Projects in :

a). Short-term Storage of High Moisture Grains

b). Long-term Storage of Grain under Plastic Covers

c). Drying in Bulk Storage of High Moisture Grains in Tropical Climates

d). Integrated Use of Pesticides in Grain Storage in The Humid Tropics

e). Moisture Movement in Grain

f). Aspects of Pesticide Relationships in Integrated Control Programs

g). ACIAR Grain Storage Information Network.

6. Assisted Dr. Ron Edwards (New South Wales University, Australia) and Ir. Soemardi, in the detailed preparation of an ACIAR proposal for the "Short-term Storage of High Moisture Grains".

II. Miscellaneous Activities

A. Attended and acted as rapporteur at the "International Workshop on Promoting Research on Tropical Fruits", Jakarta, May 29 - June 6, 1983. June 4-7 was spent in East Java and Bali, visiting fruit orchards (see Appendix IE). The conference was sponsored by AARD.

B. Consultations and Meetings

1. Dr. B.H. Siwi (BPTP-Bogor)	Puslitbangtan Postharvest Research	April 11, 1983
2. Ir. Wargiono (BPTP-Bogor)	Tuber Crop Research in in Puslitbangtan	April 12, 1983
3. Ir. Soemardi, Ir. Rumiati (BPTP-Karawang)	Cassava Research Palawija Research	April 20-23, 1983
4. Dr. Roberto Soenarjo (BPTP-Bogor, MUARA)	Cassava Research	April 28, 1983
5. Dr. Soewarno (IPB)	Postharvest Evaluation Study	April 30, 1983

6. Mr. Dudung (BIMAS)	Cooperation between BIMAS and LITBANG	May 7, 1983
7. Dr. Ibrahim Manwan (Pusgram)	Manpower Training	May 3, 1983
8. Dr. Ron Edwards (NSW Univ. Sydney)	ACIAR Proposal	May 6, 1983
9. Dr. Ernesto Lucas (USAID) Dr. Robet Julian (PIP)	Root Crop Training Course	May 11, 1983
10. Dr. Sadikin (LITBANG)	Postharvest Evaluation Study	May 13, 1983
11. Dr. B.H. Siwi (BPTP-Bogor)	ACIAR Proposals	May 14, 1983
12. Dr. Sutono (Brawijaya)	Cassava in Indonesia	May 31, 1983
13. Dr. Ernesto Lucas (USAID)	Cassava Marketing Project	June 10, 1983
14. Dr. Sadikin (LITBANG)	Evaluation Study	June 11, 1983

C. Trips

1. Three days each week were spent at the Sub Balai Tanaman Pangan in Karawang, therefore trips to Karawang were made each week. This schedule of 3 days/week in Karawang and 3 days/week in Bogor will be continued.

2. From May 24-27, 1983, the consultant travelled to Lampung, Sumatra, to inspect cassava proccesing and production. A trip report appears in Appendix IV.

3. From June 4-7 the consultant accompanied approximately 40 participants in the "International Workshop on Promoting Research in Tropical Fruits" to East Java and Bali in order to observe fruit orchards. A trip report apprears in Appendix V.

III. Problems

A. General

1. Research activities, within AARD, in the area of postharvest technology are minimal and are not well coordinated.

2. Accurate, comprehensive statistics on cassava production, utilization and economics are not available for Indonesia and Indonesian scietists are reluctant to cite figures.

3. Market studies for various cassava end - products (starch, gaplek, etc.) are needed.

4. There is a lack of communication between cassava producers, processors and researchers in Indonesia.

B. Specific

1. There is a definite lack of funds and manpower in the area of postharvest research in Indonesia.

2. Researchers at BPTP - Karawang are forced to work on a wide range of palawija crops, hence no one commodity is adequately covered.'

3. Scientists at BPTP - Karawang lack adequate training in the fields of chemistry, food analysis, food microbiology and food processing.

4. Research activities at BPTP - Karawang appear disjointed and could benefit from long-term goal oriented planning.

5. Comprehensive review of the literature prior to initiation of a research project seldom occurs, due to insufficient resources or the lack of resources in Bahasa Indonesia.

IV. Proposed Solutions

A. General

1. A "Postharvest Evaluation Study" has been proposed, in order to assess postharvest research in AARD and to recommend possible restructuring.

2. An effort to increase communication between cassava producers, processors and marketers should be made. A report on the state of the art on cassava in Indonesia should be produced.

3. Marketing studies will be initiated under a USAID - funded project on "Secondary Food Crops Utilization".

B. Specific

1. AARD must make a bigger committment to postharvest research and increase manpower training in this area.

2. If possible, researchers should concentrate on one food commodity rather than several.

3. The consultant has initiated a training program at BPTP - Karawang in Research Methodology in order to improve research techniques.

4. Long-term planning of research at BPTP - Karawang has begun and should be continued in order to better orient research activities.

5. Up-to-date literature is expensive and difficult to attain in Indonesia. Indonesian scientists should be encouraged to apply for the various free publications available. In addition, translation of English - language materials would be beneficial.

V. Plans

A. Continue discussions concerning 1983/84 research proposals at BPTP - Karawang.

B. Continue weekly seminars/labs and weekly English training.

C. Survey cassava production and processing in Central Java and Lampung.

D. Initiate research project on storage of tapioca starch.

E. Coordinate postharvest evaluation study.

F. Edit proceedings of International Tropical Fruit Workshop.

G. Attempt to locate a volunteer to teach English at Karawang.

APPENDIX IA

PROPOSED ACTIVITIES AT BPTP - KARAWANG

DIANE M. BARRETT

On April 28 I met with Pak Soemardi and Ibu Rumiati to discuss my activities for the next two years and those of a possible short term consultant(s). Those activities which I would be involved in include :

1. Design of a long term plan for research at BPTP - Karawang. This plan would cover research topics in postharvest treatment of cassava, corn, soybeans and rice for the next five years. A short term consultant might be useful in coordination of this plan.

2. Development of research proposals for 1983/1984, based on budget allocations and previously selected topics. Allocation of topics to various researchers, definition of methodology and analytical techniques will also be detailed.

3. Identification of postharvest problems with cassava, corn, rice and soybeans at the farm level, KUD level and factory level in the major production areas. This would take place in the form of a survey, preferably in Gunung Kidul, Karawang and Lampung. Observations might take place with a team consisting of an agronomist, myself and a Karawang staff member.

4. Assistance with research on fresh storage of cassava, storage of gaplek and tapioca, processing cassava, and any other research projects on going at BPTP- Karawang.

5. A series of seminars on research methodology, including laboratory design, sampling techniques, analytical methods and instrumentation. These would take place on a regular basis, perhaps every week, and would include a practical lab session.

6. Development of a workshop on postharvest treatment of foods, in conjunction with experts from Indonesia and foreign organizations.

7. Coordination of possible training programs at BPTP-Karawang, in conjunction with experts from Indonesia or related institutions outside Indonesia.

8. Improvement of relations with other organizations, both within and outside Indonesia, who are working in postharvest technology.

9. Improvement in use of the English language, with the objective of sending staff for short term training in the U.S., through weekly English conversation sessions.

A tentative plan of work appears on the following page, for the next six months. One of the priority activities is that of developing a long term research plan to guide us in future proposals.

As far as a workshop is concerned, a tentative list of Indonesian and foreign experts who might be willing to offer seminars was made. These include :

Name	Specialization	Affiliation
1. Prof. Dr. Adnan	Food Processing/Chemistry corn, soybeans	Gadjah Mada
2. Mr. Sumangat	Postharvest Processing/ Engineering corn, rice	Gadjah Mada
3. Prof. Sutono	Cassava Processing	Brawidjaya
4. Prof. Soewarno	Postharvest Proceessing	IPB
5. Dr. Eriyatno	Postharvest Processing Equipment	IPB.
6. Dr. Hadi Karya	Engineering/Small Scale Equipment Construction	IPB
7. Dr. Winarno	Postharvest for Cassava Improvement at the Farm Level	IPB
8. Prof. Siswadhi	Policies for Cassava Improvement at the Farm Level	IPB
9. Drs. Coursey Boothe or Cooke (others ?)	Cassava Processing	TPI
10. Dr. Cock	Cassava Agronomist	CIAT
11. Dr. Skiles-head	Postharvest Processing	PIP
12. Dr. Emma Data	Tuber Processing	Philippines (PRCRTC)

I will begin contacting these people as soon as possible to find out their particular area of expertise, and their availability within the next six months.

The following is a list of proposed research, in the various commodities, for 1983/1984 :

PLAN OF WORK - DIANE BARRETT - SUB BALITTAN KARAWANG

ACTIVITY	May 1983	June 1983	July 1983	August 1983	September 1983	October 1983
A. Administrative						
1. Help design Long Term Research Plan	—	—				
2. Develop Research Proposals for 1983/84	—					
3. Improve contacts with other institutions						
B. Research						
1. Identification of Postharvest Problems-survey	—	—				
2. Cassava Storage and Processing		—	—	—	—	—
3. Corn, Rice and Soybean Research (as desired)		—	—	—	—	—
C. Training						
1. Seminars on research methodology (4x/month)	—	—	—	—	—	—
2. Workshop (in Karawang) on Postharvest technology				? —		
3. Training programs in Karawang					? —	
4. Training programs in U.S.A.					—	—
5. English training (1x/week)	—	—	—	—	—	—

RESEARCH PROJECTS AT BALITTAN KARAWANG 1983/1984

Soybeans (Rp. 3 juta)

1. Processing after cutting
2. Prolonging viability during storange, using chemicals

Rice (Rp. 3,8 juta)

(decrease losses in rice)

a. % green grain (immature) and storage life
b. Drying rice during wet season, using higher temperatures
c. Level of immature/broken rice using inexpensive aeration
d. Methodology of telling quality of rice at the farm level (correlation with physical test ?)
   - immaturity
   - dirt/filth
   - moisture content
   - yellow grain

Corn (Rp. 1.9 juta)

(increase storage life)

1. Influence of immature grain on storage life
2. Storage of corn with CO_2 (urea, dry ice)
   - or air tight storage - but needs low % moisture

Mungbeans (Rp 2 juta)

(Decrease damage for production - at harvest time)

1. Storage of mungbeans with CO_2
2. Influence of immature mungbean on storage (damage in field if wait too long)

Cassava (Rp. 2 juta)

1. Influence of storage of fresh cassava on quality of tapioca
2. Methods of storing tapioca on the farm

KERJASAMA

1. Paddy Storage with "Lumbung" (ASEAN) budget from ASEAN but money was fixed @ 11 milion in 1978.

2. Dinas Pertanian, BIMAS, KUD, BULOG
usually they have a broad proposal
then Karawang does all basic research!

3. ASEAN - with bilateral Indonesia/Australian
corn and soybeans.

APPENDIX IB

RESEARCH METHODOLOGY SEMINARS

DIANE M. BARRETT

Weekly seminars, followed by laboratories, will be given by the consultant in the area of Research Methodology. Each seminar will last one hour, followed by a two hour laboratory. The participants will include the 7 research staff members ar BPTP - Karawang, and 2 laboratory technicians. Instruction will be given in bahasa Indonesia. The schedule of lectures apprears below :

Topic Number	Topic Title	Number of Weeks
I.	Quantitative and Qualitative Analysis	½
II.	Safety Procedures in the Laboratory	½
III.	Chemicals and Equipment	(4)
III.A.	Chemicals	1
III.B.	Laboratory Equipment	2
III.C.	Calibrating Equipment	1
IV.	Analysis of Real Substances	2
V.	Moisture Analysis	2
VI.	Ash and Mineral Analysis	2
VII.	Carbohydrate Analysis	3
VIII.	Protein Analysis	2
IX.	Fat Analysis	3
X.	Vitamin Analysis	3
XI.	Analysis of Non Nutritional and Foreign Substances	3
XII.	Analysis of Rice	3
XIII.	Analysis of Corn	3
XIV.	Analysis of Cassava	3
XV.	Analysis of Soybeans	3
XVI.	Analysis of Mungbeans	3
XVII.	Analysis of Peanuts	3
XVIII.	Scientific Writing	2

APPENDIX IC

MEMO

TO : FILES

FROM : DIANE BARRETT

RE : 1983/1984 BPTP - Karawang Research Meetings (June 14 - 16)

On June 14 - 16 we held intensive meetings with the BPTP - Karawang on 1983/1984 research proposals. The results are summarized below :

I. BERAS (Rice)

(1). Menekan Butir Kuning/Butir Rusak Dengan Cara Aerasi di Tingkat Petani (Decreasing Yellow Grain/Spoiled Grain Contents with the Aeration Method at the Farm Level)

Ir. Soeharmadi

Variables :

a. Aeration method : None, lateral ventilators, vertical ventilators x 3

b. Rice variety : PB-36, kreung (Aceh) x 2

c. Storage time : 7, 14, 21, 30, 45, 60 days x 6

Replication : x 2

Amt. sample : 500 kg

Plots : (3 x 2 x 6) x 2 = 72 plots

72 plots x 500 kg = 36,000 kg total

Variables to measure :

a. Inside, outside temperature

b. R.H.

c. Quality

d. Percentage yellow, spoiled, broken rice

(2). Cara Penentuan Mutu Gabah di Tingkat Petani (Methods of Determining Rice Quality at the Farm Level)

Ir. Suismono

a. Moisture content

1. Variables

a) Visual - bite, peel, crack, etc. x 5

b) Moisture content - 14, 20, 22, 24, 28% x 5

2. Replication : x 3

3. Amt. sample : 5 kg

4. Plots : (5 x 5) x 3 = 75

75 plots x 3 kg = 225 kg total

5. Variables to test :
   a) % pecah
   b) % suara
   c) % kenyal
   d) % hanam

b. Filth

1. Variables :
   a) Chemical - 96% spirits, water, 5%;salt water x 3
   b) Moisture content - 14, 20, 22, 24, 28% x 5
2. Replication : x 3
3. Amt. sample : 5 kg
4. Plots : (3 x 5) x 3 = 45
   45 plots x 5 kg = 225 kg total
5. Variables to test :
   a) Filth after harvest
   b) Filth after drying
   c) Speed of falling in H_2O

c. Yellow, Red, White Rice

1. Variables :
   a) Visual - Peel, _____, no treatment x 3
   b) Moisture content - 14, 20, 22, 24, 28 x 5
2. Replication : x 3
3. Amt. sample : 5 kg
4. Plots : (3 x 5) x 3 = 45
   45 plots x 5 kg = 225 kg total
5. Variables to test :
   a) color.

II. JAGUNG (Corn)

(1) Pengaruh kadar butir muda terhadap daya simpan jagung
(Influence of immature grain content on storage of corn)
Ir. Lubis
Variables :
a). Percent immature grain - 0,10, 20% x 3
b). Percent moisture, grain - 11% x 1
c). Packaging material - plastic bag, gunny sack x 2

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Replication : x 3
Amt. of sample : 100 kg
Plots : (3 x 1 x 2) x 3 = 18
18 plots x 100 kg = 1,800 kg total
Length of storage : 2 weeks
Variables to measure : temperature

(2) Penyimpanan jagung pipilan dengan CO_2
(Storage of Shelled Corn with CO_2)
Ir. Soemadi
Variables :
a). Variety of corn - Arjuna, Local x 2
b). Moisture Content, corn - 10, 12, 14, 16, 18% x 5
c). CO_2 content - 0, 0.25, 0.50, 0.75, 1.0% x 5
d). Packing - plastic bag
Replication : x 3
Amt. sample : 25 kg
Plots : (2 x 5 x 5 x 1) x 3 = 150
50 plots x 25 kg = 1,250 total
CO_2 source : solid, Rp. 250,-/gr ?

III. UBI KAYU (Cassava)

(1) Pengaruh lama penyimpanan ubi kayu segar terhadap rendemen dan mutu tapioka (Influence of length of fresh cassava storage on yield and quality of tapioca)
Ir. Soeharmadi/Diane
Variables :
a). Method of storage : Plastic bag with banana husk, wood box with sawdust, none x 3
b) Method of processing tapioca : traditional, KOH x 2
c) Length of storage : 0, 15, 30 days
Replication : x 3
Amt. of sample : 30 kg
Plots : (3 x 2 x 3) x 3 = 54
54 plots x 30 kg = 1620 kg total

Variables to measure :

a. Fresh cassava

1. Color change
2. Moisture content
3. Fiber content
4. Ash content
5. Starch content
6. Spoiled (%)
7. Wounded (%)

b. Tapioca

1. Moisture content
2. Starch content
3. Ash content
4. Fiber content
5. HCN content
6. Viscosity
7. Acidity
8. Mesh size
9. Cleanliness
10. Dry appearance

(2). Cara penyimpanan tepung tapioka di tingkat petani (Method of storing tapioca at the farm level)

D. Barrett

Variables :

a). Packaging material-gunny sack, gunny + polyethylene sack, laminated paper sack x 3

b). Moisture content, tapioca - 12, 14% x 2

c). Length of storage - 0,2, 4, 6, 8, 10, 12, mos. x 7

Replication : x 3

Amt. sample : 25 kg

Plots: (3 x 2 x 7) x 3 = 126

126 plots x 25 kg = 3150 kg total

Variables to test :

a). Moisture

b). Starch

c). Ash

d). Fiber

e). HCN

f). Viscosity

g). Acidity

h). Mesh Size

i). Cleanliness

j). Dry appearance.

APPENDIX ID

TRIP REPORT

CASSAVA PROCESSING IN LAMPUNG

May 23 - 27, 1983

DIANE M. BARRETT

From May 23 - 27, 1983 I traveled with Dr. Roberto Soenarjo, Root Crop Breeder (BPTP - Bogor), to Lampung to visit farm and industrial level cassava processing facilities. Four locations were visited and are summarized below :

A. Farm Level Cassava Processing

Homes in the village of Tamanbogo, near the Sub Balai Penelitian Tanaman Pangan (30 Km from Metro) were visited. Primarily sweet cassava was being grown and the majority of this was being sold fresh to factories for further processing. During the cassava harvesting season, some sweet cassava is processed at the home level into Javanese products such as tiwul or oyek. Problems observed in farm level processing included the following :

1. Cassava is rarely harvested at its optimal maturity, hence farmers do not receive as much monetary reward for their crop, nor do they receive the most nutritious product possible.

2. Storage of cassava on the farm is difficult due to its rapid deterioration. Fresh roots usually must be processed, sold or consumed directly.

3. Dried cassava chips and gelondongan exhibit extensive deterioration due to mold. Before use, the dried products are usually re-wet and the mold is scraped off, resulting in large product losses.

4. Drying cassava is difficult during the rainy season or times of decreased sunshine. Excessive deterioration due to browning and mold attack is common.

B. Semi-Automatic Starch Processing Plant

The second visit was to the Pabrik Sagu Bangun, Kampung Buyut Hilir, Gunung Sirih. This is a small factory which uses both sweet and bitter cassava. Daily production reaches a maximum of approximately 70 tons of starch/day. Some problems observed with this semi-automatic plant included :

1. Fresh cassava roots are not graded upon entering the factory, but instead sweet, bitter, spoiled and unspoiled roots are all mixed together. In addition, farmers do not always remove all of the fibrous cassava neck before selling their roots, and these fibrous materials are incorporated into the starch.

2. After the ground cassava roots are sprayed with water, the fibrous residue is thrown away. This residue still contains quite a bit starch, which could be further extracted, or else the residue could be used for animal feed.

3. The acidic, cyanogenic waste water from the starch/water solution is not treated, but is dumped directly into a nearby stream.

C. Cassava Production Area

A cassava production area, owned by P.T. Padangratu Agricultural Corporation (Pago) was also visited. Pago owns approximately 11,000 Ha of land, all of which is planted to cassava. Processing problems noted were :

1. Because of the high cost of production and the cost of the processed cube or chips, cassava processing is not feasible for many cassava producers.

2. Cube production is too labor intensive.

D. Cassava Pelletizing

The final visit was to the Lampung Pelletizing Factory (LPC) in Teluk Betung. LPC was built in 1971 and is the oldest pellitizing factory in Indonesia. LPC manufactures various products, including cassava pellets, rice bran pellets, kopra pellets and cassava flour. The major problems associated with pellet production were :

1. Raw material (cassava) is lacking, due to competition with starch, flour, and other pelletizing companies. It is easier for farmers to sell cassava roots fresh than it is to process them into gaplek for subsequent pellet production.

2. During harvesting periods excess gaplek is stored for up to 3-6 months at 20% moisture. It is common for piles of gaplek chips 5-6 meters high to have ½ meter of deterioration on the top and sides of the piles.

3. Storage facilities are insufficient. Adequate facilities which allow ventiation and a warm environment are essential.

4. The final pellets are dark brown in color. This is due to browing during pellet production. When pellets are pressed, frinction against the pellet form walls causes an increase in temperature and induces browning.

5. Government regulations concerning cassava processing are confusion. Starch production falls under the jurisfiction of the Department of Agriculture, because raw tubers are the starting materials, while pellet production (from dried gaplek) falls under the Department of Industry and Trade.

Overall, the trip was successful. It was suggested that a return trip be planned for the peak cassava producing period in July - August.

APPENDIX IE

TRIP REPORT

TROPICAL FRUITS IN EAST JAVA AND BALI

JUNE 4-7, 1983

DIANE M. BARRETT

1. Papaya Farm - East Java - Saturday - June 4, 1983.

The first field trip was to a five hectare papaya farm where Red Thailand variety papaya, aged two years, was growing. The papaya trees were too tall, and the trunks were too thick at the top, probably due to lack of or inadequate use of fertilization, or water shortage. Workshop participants suggested the use of additional fertilizer and the use of a complete fertilizer.

2. Apple Orchard - East Java - Saturday - June 4, 1983

A ten hectare apple orchard was the site of the second field trip. The orchard grew two varieties of apples, Rome Beauty and a local variety, Mana Lagi. The root stock used is unknown, although efforts are being made to identify it through Dutch sources.

Two apple crops are produced per year, with the average yield 30 tons/Ha/Year. The crop which was set during the dry season produced a greater yield. The first crop is harvested during the dry season, and two months later trees are defoliated. Production occurs after four months. Workshop participants suggested the introduction of more bee hives to increase flower pollination.

3. Propagation Nursery - East Java - Sunday - June 5, 1983

Mango, citrus and guava were being propagated at this nursery, which is funded by the national bank of Indonesia. The manager claimed 60% success, but workshop participants observed perhaps only 50% success. Workshop participants noted some unusual practices i.e. the use of a tree cover with shade and the growing of seedlings directly in the ground rather than in containers. The nursery seemed to suffer from an excess of weeds. Other suggestions included the possibility of grafting at six months rather than the more advanced age being used; the need to pre-treat bud wood; and the

fact that the sign wood was too immature and had dried out. Two types of grafting were being used, the wedge graft and the cleft graft.

4. Salak Orchard - Bali - Monday - June 6, 1983

The last field trip was to a salak orchard in central Bali. There are 1,660 Ha of salak on Bali, or 5 million trees, some of which are 200 years old. Three varieties, Gondok, Nangka and Gingging are commonly grown, Nangka being the best. There are two harvests, of about 2 Kg each, per tree per year, the first in January/February and the second in July/August. The first crop does not come until the tree is six years old.

Salak shelf life is only 7 days. For this reason salak would be difficult to export. During the off-season the market price for salak is 1200 Rp/Kg, whereas during the harvesting season the market price drops to Rp 400/Kg. Salak seedlings are usually planted in nurseries first, then transplanted.

DMB:s.

APPENDIX II

MONTHLY REPORT

23 May to 30 June, 1983

CHHORN LIM

I. Principal activities and accomplishmets

A. Orientation

My family and I arrived Bogor on the evening of May 22, 1982. The next day, May 23, I reported to RMI office. I was oriented about RMI/AARP systems and procedures by the Project Leader, Dr. William L. Collier and the Project Administrator, Mr. Carl R. Fritz.

At the Research Institute for Inland Fisheries (RIIF), I was briefed about the on-going research activities by its Director, Mr. Rustami Djajadiredja. The tour of the research facilities at the Borgor Station was done with the guidance of Mr. Hidayat Djajasewaka and Mrs. Ningrum Suhenda.

On May 28, 1983 I attended a meeting called by the Director of the Institute. Also attended the meeting were the senior research staff involved in various research projectsunder RIIF. The objectives of the meeting were to acquaintme with the staff whom I will be in frequent association during my stay here and to discuss about my functions. My major activities which were discussed during the meeting are :

1. To assist and advise research staff in conducting research in nutrion, feed technology and feeding.
2. To assist and encourage the research staff in preparing technical papers for publication in international journals.
3. Give lectures/seminars in nutrition and aquaculture
4. Assist the Institute in the identification of equipment/ facilities needed for research in nutrition
5. Assist the Institute in preparing project proposal for external funding
6. Conduct some researches in collaboration with the staff of RIIF.

B. Review of research proposal

Assisted Mr. Hidayat in formulation of feed and redesigning a research proposal entitled : Effect of Various Diets on the Production of Common Carp. This research is being conducted at Cibalagung.

C. Review of technical paper

Assisted Mrs. Ningrum in preparing a technical paper entitled: Determination of the optimum Level of Vitamin Premix in Common Carp Diet. This paper will be presented at the Symposium on Fin Fish Nutrition in Asia sponsored by IDRC which will be held in Singapore in August, 1983.

D. Travel to substations of RIIF

A trip was made to Pasar Minggu on 6 June with Mr. Hidayat upon the request of Mrs. Haniah Hadidjaja. The discussion was on nutrition and feeds of Macrobrachium rosembergii (see Appendix I).

On 10 June a trip was made to Depok substation with Mrs. Ningrum upon the request of Mrs. Haniah and Mrs. Sri Sumastri. The topics of discussion were feeds for broodstocks, grow-out, fingerling and fry of freshwater catfish, Clarias batracus (see Appendix II).

E. Recommendation on the quality control of fish feed.

Wrote a paper entitled "Recommendation on the Quality Control of Fish Feed". This was done upon the request of the RIIF's Director (see Appendix III).

F. Assessments of the nutritional information done at the RIIF, the available research facilities, and the capability and strength of the existing manpower involved in nutrition works.

These were done through discussion with the research staff, review of the past and present works and field observations.

G. Lectures/Seminars

Gave lecture on the Principles of Nutrition. The outline of the lecture/seminar on Nutrition and Aquaculture is given Appendix IV.

II. Miscellaneous activities

A. Consultation by various staff in nutrition and aquaculture related topics and discussion with some staff about the on-going research studies.

B. Assisted the nutrition staff in identification and procurement of a mixer and a grinder.

C. Assisted the Director of the Institute in preparing a term of reference in Nutrition for discussion during ASEAN meeting in July.

D. Reviewed publications on common carp nutrition.

III. Constrainsts

A. Lack of essential equipment and space for feed preparation and storage

B. Insufficient funding support and lack of qualified manpower in nutrition subdivision.

C. Delay in proximate analysis of feed ingredients due to insuffiencient chemicals.

IV. Plan for July

A. Regular weekly lecture on Nutrition and Aquaculture

B. Assist the nutrition staff in the conduct of the experiments

C. Assist Mrs. Hanasiah and Mrs. Sri in the formulation of feeds and designing of the experiments

D. Assist the Institute in the design and construction of concrete tanks at Cibalagung needed in feeding experiments

E. Trip to different substations and some private carp farms

F. Identification of research topics in nutrition to be conducted in collaboration with the RIIF's staff.

APPENDIX IIA

TRIP REPORT

TRIP TO Pasarminggu Substation

June 6, 1983

Through the invitation of Mrs. Haniah Hadidjaja, Researcher and Head of the Depok substation, a trip was made to Pasarminggu together with Mr. Hidayat Djajasewaka. The purpose of the trip was to discuss about the experimental diets of Macrobrachium rosembergii.

Four feed formulae were presented by Mrs. Haniah. These formulation were given to her by someone whose name was not identified. She intended to test these diets for M. rosembergii juveniles. It was observed the the feeds were poorly formulated. The nature and level of ingredients used differ considerably. The nutrient contents (proteins, fats, carbohydrates, vitamins and minerals) and energy levels in various feeds vary significantly. If these formulae are to be evaluated, the results obtained would be very difficult to explain since there as so many uncontrollable variables among the feeds.

I was suggested that the feeds should be reformulated. The research problem selected should be more specific so one can define the objectives, set the hypotheses and design the experiment. It is understood that very little is know about the nutrition of freshwater shrinps. However, information available for penaeid spcies can be used as a guide.

Mrs. Haniah indicated her intension of conducting an experiment to determine the optimum level of crude protein for M. rosembergii juveniles. Explanation was made on the selection of various ingredients, and the necessary consideration and steps in formulating and balancing the diets. I was requested to formulate the feed for her. Mr. Hidayat is reponsible to provide me information on the proximate analyses of the various ingredientsto be used.

Another concern of Mrs. Haniah is the physical quality (water stabily) of the feed. Shrimps are slow feeders. The diets must remain stable in the water for a few hours to minimize losses of water soluble nutrients and disintegration of the ingredents which will result in pollution of the cultured environments. Discussion was centered mainly on feed preparation and use of binders. Various steps in feed preparation were explained in order to improve the physical quality of the pellet. Recommendation was also made on the use of wheat flour and sago palm starch. The combination of 5% of sago

palm starch and at least 10% bread flour would provide pellet with satisfactory water stability.

CHHORN LIM

APPENDIX IIB

TRIP REPORT

TRIP TO DEPOK SUBSTATION

June 11, 1983

A trip was made to Depok substation with Mrs. Ningrum through the invitation of Mrs. Haniah and Mrs. Sri Sumastri. The purpose of the trip was to discuss about the feeds which have been used for various stages of freshwater catfish, clarias batracus.

Upon arrival, a tour of facilities used for breeding and larval rearing was done with Mrs. Ningrum through the guidance of Mrs. Sri. Fish are allowed spawn naturally in either spawning tanks or earthen ponds. In earthen ponds, artificial holes of about 15 to 20 cm in diameter and 15 cm deep are constructed along the banks at about 20 cm below the water surface. The females lay their eggs in the holes and the eggs are allow to hatch in the ponds. Observation is made daily to locate the spawnings or the hatched larvae. Once the larvae are found in the holes, the pond water is lowered to expose the holes and collect the larvae. After the collection of the larvae, the pond water is filled back to the original level.

Concrete tnaks of different sizes are also used for spawings. Each tank was provided with spawning boxes located outside the tanks. Inside each box, earthen bricks are used to make the spawning hole. Kakaban is provided in the holes to serve as egg collectors. After spawning, the eggs are collected and hatched in the basins.

The size of the breeders used averaged about 100 g. Only a few fish spawned on each day.

Although the method of breeding used is simple, several disadvantages are observed :

a. Since the spawners used are small, the number of the eggs or larvae produced are few.

b. Since spawning did not usually occur at the same time, several batches of the larvae have to be reared. This would involve a lot of labor for larval rearing and would result in high production cost.

c. It is difficult if not impossible to mass produce the fingerlings of uniform size.

It was suggested that larger size of spawners should be developed and used. Due to the higher fecundity of the bigger fish more larvae could be obtained. Before stocking in spawing tanks or ponds, the stage of the ovary should be observed. By stocking the spawners of the same stage of ovary, more uniform spawning will occur. Another method which assure uniform spawings and therefore mass production of the uniform size fingerlings is the induced spawning using the human chorionic gonadonopin (HCG). This hormone is ready available withlow cost. The induced breeding techniques of this species have been likewise developed.

There are four feed formulae which are being used at the substation for various life stages of clarias (Broodstock,fry, fingerling and subsadult). Among the four feed formulae, it was observed that feed for subadult seems to have better nutritive value than the others. Suggestion was made for Mrs. Sri to discard the other formulae and used the subadult feed as the basis. Discussion continued on the nutritive values and limitation on the use of different feedstuffs found in the formulae. The criteria needed in feed formulation and the information on the nutrient requirements for various stages of fish were also discussed. Finally, suggestion was made to imrpove the feed formula and to reduce the cost of feed.

CHHORN LIM

APPENDIX IIC

RECOMMENDATION OF THE QUALITY CONTROL OF FISH FEED

by

Chhorn Lim
Fish Nutritionist

AGENCY FOR AGRICULTURAL RESEARCH AND DEVELOPMENT
RESEARCH INSTITUTE FOR INLAND FISHERIES
Jalan Sempur 1, Bogor
June 24,1983

I. INTRODUCTION

In semi-intensive or intensive culture operation, feed is very important from the economic standpoint. It represents the major item of expenses. Therefore, the quality of feed should be the primary concern of fish farmers. The feeds should be acceptable or palatable by fish, nutritionally adequate, have good water stability and least cost.

Most fish farmers do not have adequate knowledge in nutrition, feed and feeding practices. Oftentimes, when they purchase the feed, they think only in term of cost per kilogram, bag or ton. They haggle with the seller over the price of a feed, rather than consider other important factors and the net return. To satisfy the buyers and to make more profit, some feed manufacturers, especially those in the developing countries, tend to sacrifice the quality of the feed in order to produce least cost feed. Thus, to assure that fish feeds available in the market are of acceptable quality it is necessary that the government establishes rules and regulations for the quality control of fish feeds.

II. QUALITY CONTROL

There is no one best feed formula for a particular species of fish or animals. Generally feed formulaeare flexible. To come up with a least cost feed one should not get into the habit of using the same formula year after year. The ideal feed is the one that maximizes the production at the lowest cost. An expensive feed may produce the highest gain but the production cost may make the feed economically impractical. Similarly, cheapest feed is not always the best since it may not allow maximum production. Thus, the cost per unit of production should be used as the determining factor in selecting the best feed.

To produce good quality feed several factors should be considered. These shall be the responsibility of the feed manufacturers to protect their clients and other manufacturers from competition. The followings are the major steps that feed manufacturers should take into consideration before manufacturing feeds to be sold in the market.

2.1. NUTRIENT REQUIREMENTS

The basic information needed in feed formulation is the nutrient requirements (protein, amino acids, fat, fatty acids, energy, vitamins and minerals) of the particular species concerned. A moderate amount of information is available for some species of fish such as trout, salmon, channel catfish, eel and common carp. This information should be used only as a proximate guide. It should be remembered that the levels of the various nutrients recommended are not necessarily the best or least amounts to be incorporated. Other factors affecting the nutrient requirements of fish such as age or size, culture environment

and types of production should be considered. Sometimes, allowances are given to compensate the lost or destruction of certain nutrients during processing and storage.

Depending upon the circumstances, feed formulator may not be concerned with all know nutrient as some are more critical than the others. Among the major nutrients required,protein and energy are generally considered first. Protein is the most expensive among the macronutrients and cannot be replaced by the other nutrients such as carbohydrateswhich can be replaced by fats. A protein level in excess of the requirements is normally not harmful but makes the feed cost higher than necessary. The most efficient diet is the one that has the lowest level of protein but contains the necessary amino acids requirements of fish.

The level of energy in fish feed are also of prime importance. Too much energy in the diet is wasteful, may cause excessive fattiness and limit the amount of feed consumption since, like terrestrial animals, fish eat to satisfy their energy needs. If feed is too low in energy, protein and other nutrients are not utilized to their fullest potential for growth.

The next step to be considered are the types and levels of fats, carbohydrates, vitamins and minerals. The vitamins and trace minerals are generally added to the feeds in form of premixes.

2.2. FEEDSTUFFS

Good quality feed cannot be made without good quality ingredients. Normally a number of agricultural products or by-products are locally available and have been found to be valuable fish feed components. The nutrient composition and contribution of different feedstuffs to be

used should be known. If actual chemical analysis values are not available, average analysis figures may be used. However, information on the biological values of various feedstuffs is very limited.

The availability and cost of different feed ingredients are important factors which determine the cost of feed. To obtain least cost diet, feed formula should be changed from time to time as the prices of the ingredients changed. However, feed manufactuers should maintain some kind of quality control since there are limitations on the use of certain feed components. Sometimes, a feedstuff may be incorporated in the diet up to a certain level, but it cannot be used in unlimited quantity without possible implications. For example, ipil ipil leaf or seed meal should not be included in large quantity since it contains mimosine known to be harmful to fish. Furthermore, a nutrient in a particular feedstuff may not necessarily be of the same nutritive value as the same nutrient in another feedstuff. The protein from fish meal has better nutritive value than plant protein.

Changes of ingredients or their proportions may also result in the changes of the physical quality and palatability or acceptability of the diets. For instance,rice and wheat or their by-products are used for their binding quality as well as for energy sources. Significant reduction of these product may result in less compact diet or poor water stability. Increase the level of fat may increase the palatability but decreases the binding capacity of other ingredients since fat acts as lubricant which decreases or prevents the gelatinization of starch. Addition of large amount of hygroscopic ingredients such as salt and mollasses may result in higher moisture content of stored pellets which in turn softens them or decreases the water stability.

2.3. METHODS OF PROCESSING

Generally fish feeds are processed into various physical forms and sizes to minimize wastage anf improve their efficiency. The methods of processing such as extrusion process for floating feeds and pelleting for sinking feeds affect the composition of the diets. Floating feed contains substantial amount of starch for satisfactory gelatinization and expansion. In addition, the processing techniques are also important with regards to the fate of certain nutrients such as vitamins. Consideration must, therefore, be taken to include in the formulae a magin of safety to cover losses during processing.

Grinding the ingredients to a small particle size greatly improve the physical properties and nutritive values of feeds. Fine grinding results in better mixing, improves the binding quality of the pellet and increases the efficiency of feed utilization through better digestion.

2.4. WATER STABILITY

The quality of fish feed is not only determined by its chemical composition, but also by its physical quality, especially the water stability. Unlike terrestrial animals, fish live, grow and reproduce in the waters. If water unstable pellet is used, large amount of waste will accumulate in the culture environment. This will result in water pollution and poor feed conversion value. Thus, the pelleted feeds for aquatic animals should remain stable in the water for a sufficient period to allow time for the fish to eat. The water stability of the pellets varies depending upon the species. Channel catfish can normally consume feed fed ad-libitum within 15 to 20 minutes. Therefore, only 20-minute stability is required for this species.

Common carp can finish their feed within 1 hour. The diet for this species should be stable in water for at least 1 hour. Shrimps are very slow feeder. Their pellet should have at least 3 to 4-hour water stability.

2.5. TYPES OF FEED

The purpose for which the feed is intended to be used has a significant effect on its composition and levels of nutrient content. For instance, if the feed is to be used for fish stocked in ponds at low to moderate density, certain vitamin and mineral supplements can be omitted in the formula. In this case, it is assumed that the nutrient which are lacking in the diet will be provided by the natural food organisms grown in ponds. On the other hand, if the fish are to be cultured intensively (tanks, cages, raceways, etc.) where natural foods are limited, the feed must certain all the required nutrients at the levels more or less similar to those recommended.

2.6. PACKING, HANDLING AND STORAGE

After processing, the dry pellet should be reduced to a moisture content of not more than 10 percents and cooled to ambiant temperature before bagging or storing. The bags should be multi-walls and have plastic liners to prevent or reduce moisture uptake, retard lipid oxidation and preserve the aroma, flavor and color.

Fish feeds are fragile. They must be handled with care to minimize breakage and reduce the amount of fines. Fines in feed may not be consumed by fish and cause water pollution.

It is not advisable to store feed for a period longer than three months. Feed should be stored in cool, dry area. High moisture causes the pellet to become soft and consequently reduce the water stability. Moisture also

enhances the destruction of some nutrients such as vitamin C and the growth of molds which may produce mycotoxin which is toxic to fish. High temperature accelerates oxidation or rancidity of lipids and destruction of some feed nutrients such as fat-soluble vitamins. Rancid fats may produce peroxides which are harmpful to fish. Furthermore, rancidity causes off-flavor of the feed which in turn reduce the palatability of the feed.

These above mentioned factors must be taken into consideration by feed manufacturers in order to produce good quality fish feeds. Fish farmers should also be knowledgeable of these and understand the languages used in nutrion to make best buy in feeds.

III. FEED REGULATIONS AND LAW

Numerous commercial fish feeds are available in the market but the quality varies considerably. To protect fish producers from purchasing poor quality feeds and to help maintaining the reputation of the feed manufacturers, It is imperative that "Feed Regulations and Law" be established. To effectively impose the regulations and enforce the law, the Fish Feed Control Board shall be created. The Board shall establish rules and regulations governing the sale and control of fish feed quality. The following are some recommendations.

3.1. FEED REGULATIONS

3.1.1. Registration - All mixed fish feeds offered, distributed or exposed for sale shall be registered with Fish Feed Control Board. The registration shall be valid for one year (unless cancelled earlier due to violation of

Feed Regulations and Law) and subject to renewal yearly.

3.1.2. Labeling or feed tag - All commercial fish feeds shall be required to carry label or tag (Figure 1) indicating the followings:

a. Net weight of the feed and date manufactured

b. Brand name and product name

The brand name could be any word, name or symbol which identifies the feed of a manufacturer and distinguishes it from the feeds of the other producers (e.g. AAA). The product name identifies the specific use of the feed (e.g. CARP GROWER). However, these names should not tend to mislead or misrepresent the feed in amy respect.

c. Guaranteed analysis

The feed label should contain the guaranteed analysis of certain nutrients found in feeds:

- Dry matter
- Crude protein
- Ether extract or crude fat
- Crude fiber
- Ash
- Nitrogen-free extract
- Calcium
- Phosphorus

The list should indicate minimum values for dry matter, crude protein, crude fat and nitrogen free-extract, and maximum values for crude fiber and ash. Both minimum and maximum values are given for calcium and phosphorus.

NET WEIGHT 25 Kg
DATE MANUFACTURED: 6/23/83
AAA

CARP GROWER

medicated

To be used as medicated feed for carp
To help in the prevention of Aeromonas sp.

ACTIVE DRUG INGREDIENT

Oxy-tetracycline 0.020%

WARNING

Do not feed to fish within 14 days of harvest

GUARANTEED ANALYSIS

Dry matter, not less than	90.0%
Crude protein, not less than	32.0%
Crude fat, not less than	6.0%
Crude fiber, not more than	5.0%
Ash, not more than	7.0%
Nitrogen-free extract, not less than	48.0%
Calcium, not less than 0.03% but not more than	0.04%
Phosphorus, not less than 1.0% but not more than	1.2%

INGREDIANTS

Corn meal, soybean meal, rice bran, fish meal, wheat flour, blood meal, dicalcium phosphate, Magnesium sulfate, Manganous oxide, Iron sulfate, copper sulfate, choline chloride, Inositol, Alpha-tocopherol, Panthothenic acid. Nicotinic acid, Vit.A palmitate, Ethoxyquin and Calcium proprionate

MANUFACTURED BY
OCEAN FEEDS
JALAN SEMPUR 1, BOGOR

Figure 1. Example of a fed tag or label

d. Listing of ingredients

Feed formulae used by feed companies are usually kept confidential (closed formulae). Thus,for the buyers to obtain some rought idea on the composition of feeds, the ingredients used shall be listed on the tag in decreasing order of incorporation.

e. Directions for use

Directions shall be given to what species and what size of fish the feed is intended for. For example, the label "CARP GROWER" may indicate that it should be used for common carp from 50g in weight to marketable size.

f. Name and address of the manufacturer

The manufacturer is responsible for the quality of his feed. Any adulteration or failure to meet the guarantees are liable for penalties and damages. Therefore, the name and address of the manufacturer should be clearly identified on the tag.

g. Warning

If drugs are added, the feed label must be indicated that it is medicated. The name of the drugs, the amount of the active ingredient, the purpose of medication, directions and precaution for use should be provided.

3.2. FEED LAW

The members of the FISH FEED CONTROL BOARD or its duly authorized representative shall have free access to all places of business, mills, buildings, transportation equipments and packages of all kinds used in making and selling the feed, and shall have authority to open any packages

containing feed for samples, upon full payment of the selling price of the said samples. The samples shall be taken and analyzed periodically to ensure that it meets its guarantees. Two types of analysis are generally performed in feed samples: the feed microcopy (physical evaluation) and the chemical analysis.

3.2.1. Feed microscopy

This method involves the qualitative and quantitative identification and evaluation of the ingredients of feed using the microscopes. Feed microscopy may be the least accurate analytical method but it provides quick information about the overall quality of a feed. This analysis is performed by highly trained technician who can identify and quantify various feed ingredients, determine the homogeneity of a feed and detect the adulteration and the contaminents such as the presence of molds or insects.

3.2.2. Chemical analysis

The chemical analysis gives more reliable information than the feed microscopy but it is time consuming. The procedure that has been routinely used in the chemical evaluation of feeds is the proximate analysis. This method breaks down the feeds into 6 fractions: moisture, ash, crude protein, ether extract or crude fat, crude fiber and nitrogen-free extract. The analytical procedures and the major components of the feed fractions are summarized in Table 1.

Table 1. Major fractions of feed and proximate analysis procedure

FEED FRACTION	ANALYTICAL PROCEDURE	MAJOR COMPONENTS OF FEED FRACTION
MOISTURE	Heat sample to a constant weight at temperature slightly above boiling point. Weight loss represents water. Dry matter = 100 - % moisture	Water and volatile compounds
Ash (minerals)	Burn sample in muffle furnace at 600°C for 3 hours. The remaining residue is ash	Mineral or inorganic elements
Crude protein (CP)	Determination of nitrogen by Kjedahl method CP = %N x 6.25	Protein, free amino acids, non-protein nitrogen
Ether extract (EE) or crude fat	Extract sample with ether. Remaing residue after evaporation of ether is crude fat	Fats, oils, waxes, resins, organic acids, alcohol, fat-soluble vitamins, pigments
Crude fiber (CF)	Residue left after boiling sample in weak acid and weak alkali	Cellulose, hemicellulose, lignin
Nitrogen-free extract (NFE)	No specific analysis. It is determined by: NFE=100-(%moisture+%ash+%CP+%EE+%CF)	Starch, sugar, some cellulose, hemicellulose, lignin, water-soluble vitamins

CL:jb

APPENDIX IID

OUTLINE OF LECTURE/SEMINAR PROGRAM ON FISH NUTRITION AND AQUACULTURE

CHHORN LIM

A. FISH NUTRITION

1. PRINCIPLES OF NUTRITION

1.1. Principles of nutrition
1.2. Background in fish nutrition
1.3. Importance of nutrition in fish production

2. NUTRIENT REQUIREMENTS (Qualitative and Quantitative)

2.1. Protein and Amino Acids
2.2. Fat and Fatty acids
2.3. Carbohydrates
2.4. Energy
2.5. Vitamins
2.6. Minerals

3. FEEDSTUFFS

3.1. Desirability characteristics of feedstuff
3.2. Classification

4. FEED TECHNOLOGY

4.1. Feed formulation
4.1.1. Information needed in feed formulation
4.1.2. Mathematics of feed formulation

4.2. Feed proceessing

4.2.1. Various steps in feed processing
4.2.2. Processing techniques
- Meal form feed
- Moist feed
- Floating pellet
- Sinking pellet
- Flaked feed

4.3. Feed handling and storage

4.3.1. Bagging

4.3.2. Handling

4.3.3. Storage

5. FEED EVALUATION

5.1. Physical evaluation

5.2. Chemical and Biochemical Evaluation

5.3. Biological evaluation

6. FEEDING PRACTICES

6.1. Selection of fish feed

6.2. Daily feed allowance

6.3. Feeding frequency

6.4. Daily feeding schedule

6.5. Method of feeding

7. QUALITY CONTROL OF FISH FEED

7.1. Responsibilities of feed manufactures

7.2. Feed Regulations and Feed Law

8. RESEARCH METHODOLOGY IN FISH NUTRITION

8.1. Identification of the research problem areas

8.2. Factors to be considered in selecting research studies

8.3. General considerations in nutrition research

8.3.1. Experimental diets

8.3.2. Experimental conditions

8.3.3. Methods of measurements

8.3.4. Experimental design

8.3.5. Evaluation of the results.

B. AQUACULTURE

1. PRINCIPLES OF FISH PRODUCTION (over 30 principles related to fish production will be discussed)

2. COASTAL AQUACULTURE AND THE ROLES OF ESTUARINE ENVIRONMENTS

3. BRACKISHWATER FISH CULTURE

3.1. Milkfish culture in the Philippines
3.2. Milkfish culture in Taiwan
3.3. Shrimp culture in the Philippines
3.4. etc.

4.. FRESHWATER FISH CULTURE

4.1. Catfish culture in Cambodia and Thailand
4.2. Catfish culture in USA
4.3. etc.

The lecture on these two topics will be held regularly, every Thursday, from 9:30 a.m. to 11:00 a.m. at the Auditorium of the Research Institute for Inland Fisheries, Jalan Sempur 1, Bogor.

The first lecture which will be given on June 30, 1983, will be on fish nutrition. The second lecture will be in aquaculture and will continue in this sequence until further notice.

In addition to this regular schedule, seminars will also be offered on other topics related to aquaculture. Seminars and discussion will also be done at various substations visited or upon request.

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APPENDIX III

COOPERATIVE CRIFC - IRRI PROGRAM
THE INTERNATIONAL RICE RESEARCH INSTITUTE

CABLE ADDRESS :
IRRIAID BOGOR

MAIL ADDRESS
COOPERATIVE CRIFC - IRRI PROGRAM
IRRI - P.O. BOX NO. 107
BOGOR, INDONESIA

July 2, 1983

To : Dr. J. Ritchie Cowan
IRRI Liaison Scientist

From : J.L. McIntosh
Farming Systems Liaison Scientist

Subject : Monthly Report, June 1983

I. Principal Activities and Accomplishments

1. Prepared paper and participated in the Sixth Cropping Systems (Farming Systems) Workshop, June 20-21, 1983.

   This was an excellent meeting in which research in the different land areas over the past 10 years was summarized and management guidelines developed. One of the most significant reports was presented by Pak Sukmana of BIMAS who very clearly outlined BIMAS strategy for implementation of cropping systems research technology in the different land areas of Indonesia. This has been a major objective of the research - that is, to develop the technology to the point where it could be implemented by extension on a wide scale.

2. Prepared with Mr.Juber a paper for the Soybean Symposium to be held in Tsukuba, Japan, September 26 - October 1, 1983. Copy of this paper attached.

3. Interact with Indonesian colleagues through discussions, editing of reports and preparation of project proposals. The crop/livestock project proposal has been prepared and the first draft submitted for administrative review

II. Miscellaneous Activities

1. Continued Dr. Carangal's consultancy and returned from trip to Palembang (Sembawa) and Batu Raja (3 days).

   It is proposed that the Trans III Farming Systems Research on land clearing and management be carried out in the newly opened areas, while the crop/livestock research will be carried out in the older areas where more permanent conditions exist in Baturaja.

2. Consultations (other than research colleagues).

a. Alan Strout	MIT/WB
b. USAID	Rural Development Agriculture
c. Greta Watson	AARP/BARIF
d. Dr. Syarifuddin	SARIF
e. Research dissemination	CRIFC
f. A.B. Wanders	ATA - Dutch
c. Dr. Soewardjo	P3MT

3. Court Proceedings for Adoption of Jonathan Michael McIntosh.

4. Sukamandi - one day

III. Constraints

Development of projects and research progressing well. Older cropping systems staff need advanced degree opportunities.

IV. Plans

1. Help develop Terms of Reference for Consultancies for P3MT projects.

2. Work with Farming Systems staff on implementation and evaluation of projects.

3. Attend final session of Consequences of Mechanization Workshop.

JLM:fh

APPENDIX IV

Quarterly Activity Report by Fritz von Fleckenstein, Agricultural Economist.

1. Past Activities and Accomplishments.

1.1 Major activities

In the past quarter I have :

1.1.1 Made an observation and analysis of field work techniques in the Agricultural Economics department, with the cooperation of Ir. IGP Sarasutha, the acting head of the department at that time. I recommended a) the use of more intensive data-collection techniques b) the study of the whole farm instead of single crops or cropping systems only and c) more co-operation with other disciplines in carrying out such studies.

1.1.2 Initiated, at Ir. Sarasutha's suggestion, intensive data collection for whole farm of 6 farmers in Baju Bodoa village, near Maros station. The purpose of this study is to compare varying intensities of data collection both for their accuracy and for the amount of time they consume, as well as to develop a whole-farm questionnaire pre-coded for the FARMAP package of programmes. This exercise is also being used as training for Maros staff. The Baju Bodoa project is being supervised by Ir. Hadijah Dahlan, at the suggestion of Ir. Sarasutha, who left to work for a master's degree at IPB in June. However, we plan to involve all staff members of Agricultural Economics and some staff members of other departments in the future.

1.1.3 Begun drafting a whole-farm questionnaire pre-coded to the FARMAP package of programmes. In drafting this questionnaire, I have consulted Ir. Hadijah, members of the soils department, the pathology department and experts in Livestock. In the future, I intend to improve the questionnaire by consulting agricultural engineering, agronomy and entomology experts in the Institute and elsewhere, as well as fisheries and small industries experts.

1.1.4 Begun preparations for the implementation of PATANAS in South Sulawesi :

1.1.4.1 : Attended meeting in Bogor concerning computer acquisition for the programme.

1.1.4.2 : Observed PATANAS work in MARIF (Malang), participated in discussion of input/output questionnaire.

1.1.4.3 : Designed a scheme for sampling of locations in South Sulawesi.

Note : development of whole-farm questionnaire mentioned in 1.1.3 is intended for eventual use in Patanas programme in South Sulawesi.

1.1.5 Made specifications for microcomputer to be ordered by MORIF. See copious documnets on this subject already submitted.

1.2 Minor Activities.

In the past quarter I have also engaged in a number of minor activities;

1.2.1 Arranged for FARMAP training for two candidates from MORIF.

1.2.2 Gave informal instruction in various topics as opportunities presented themselves.

1.2.3 Began putting my personal computer into shape for running programmes As this computer will be the only computer we have at MORIF for the next few months, we hope to use it for three purposes :

a) to train MORIF staff in basic microcomputer use,

b) to develop software to enable convenient data collection forms to be used for FARMAP.

c) to run FARMAP, at least for the analysis of the Baju Bodoa data.

1.2.4 Overseeing the disbursal of the rupiah funds assigned to Petty Cash for Maros. If we can get this onto the computer, life will be easer for us.

1.2.5 Various administrative matters which seem to come my way as designated "spokesman" for RMI at Maros. I usually try to lend a sympathetic ear, and to facilitate communication.

1.2.6 Writing the quarterly report for Maros. I am deeply honoured to be given this task.

2. Problems and Proposed solutions.

The following problems plague me:

2.1 Lack of a working computer on which to start trying out my various ideas and training MORIF staff.

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Interm solution: a malfunctioning part which is not available in Ujung Pandang or Jakarta is being procured for me by Jerry Tan in Singapore.

Long term solution: This project should give serious thought to the problem of procuring

a) spare parts
b) materials
c) repairs
d) new items, such as new pieces of software (programmes) for computers

during and after the life of the project. Machines break down, spare parts are needed, and materials, such as chemicals, computer paper, need to be reordered. Finally one sometimes would like to start with a small system (as in computers), and expand to a larger system, either by ordering new hardware, or by ordering new software (programmes), usually both.

Under the present system of procurement, it seems that none of these things can be done.

2.2 Lack of electricity at Maros. The design of the building is such that there is virtually no air when there is no air-conditioning. I find that I accomplish almost nothing on such days.

Interim solution: A number of portable tables have been purchased which can be placed outdoors. This allows somewhat more work to be done.

Long term solution: Rumor has it that the present situation, in which we have had almost no electricity for a month, is the result of the construction of a new electric line from Tallo, which will give us more dependable power.

2.3 Lack of working photocopy and reproduction facilities at Maros. Even when the power is working, the photocopier is not. Now, the machine which makes stencils from originals done on ordinary paper is also out of order. I had planned to use this machine to reproduce the Baju Bodoa questionnaires, which require a lot of paper, and had bought paper for this purpose, but I continue to photocopy. Typed

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stencils are not a practical alternative in this case.

Interm solution: photocopying in Ujung Pandang. Maros rates are twice as expensive as UP rates.

Long term solution: Perhaps more reliable machines should be purchased for Maros.

3. Plans for the future quarter.

3.1 Continue study at Baju Bodoa. Monitoring of increasing of activities as forms are drafted. Revision of forms with experience, and with feedback from other departments.

3.2 Continue the choice of the PATANAS sample. Ir. Yusuf Maamun, recently returned from UPLB with a master's degree in Agr.Economics, is the new head of the department, and has expressed great interest in getting started on this activity.

3.3 Begin training MORIF staff on the computer.

3.4 Write computer programmes to enable the easy entering of data from the Baju Bodoa questionnaire.

3.5 Finish first draft of Baju Bodoa questionnaire; create from it first draft of South Sulawesi PATANAS questionnaire.

3.6 Begin a series of seminars. The tentative topics for the coming year are as follows. Note that many of these are series of talks:

3.6.1. FARMAP, a tool for integrated research.
3.6.2. Some uses of microcomputers in Agricultural research.
3.6.3. Presentation of data (with Anwar Rizvi)
3.6.4. How to choose an appropriate statistical technique
3.6.5. Statistical Sampling : practical implications
3.6.6. Reviews of statistical techniques (with I. Corpuz)
3.6.7. Budgeting methods and sensitivity analysis.
3.6.8. Optimalization : linear programming
3.6.9. Descriptions of specific computer programmes (with Yusuf Maamun, Yulianto, Mustari)

APPENDIX V

Quarterly Report by Igmidio T. Corpuz,
Soil Scientist.

Igmidio T. Corpuz

A. Two new staff members had recently joined the Department of Soil and Soil Fertility.

   a. Ir. H. Supadmo - M. Sc. in Soil Fertility at Gajah Mada University

   b. Ir. A. Singgih - M. Sc. in Soil Fertility at Gajah Mada University

B. Activities and Accomplishments.

1. Wrote a paper entitled "Residual Effect of Three Sources of Nitrogen at Three Rates of Application ".

   The application of prilled urea, sulfur coated urea and urea supergranule even at the highest rate of 116 kg N/ha had no carry over effect for the following rice crop. There is a need to apply N every cropping.

   The pH of the soil was not affected by the application of the three sources.

2. Presented a Research Proposal on "Azolla as a Nitrogen Source for Rice" and finally assisted in the initial step in establishing the research project.

3. Participated in the generation of experimental data on several completed research projects.

4. Conducted informal training for both professional staffs and field technicians in the implementation of research projects. The subject matters include site identification and selection, proper laying out of experimental plots and research data generation. These were carried out right in the experimental sites, thus the need for several field trips.

.....2/

5. Participated in the Weekly Saturday Seminars at the Institute.

C. Plans for the next quarter.

1. Continue actively participating in setting up field experiments.
2. Continue assisting in preparing reports of completed research projects.
3. Start the series of lectures. Tentative topics for 1983/1984 are:
    1. Strategy in Solving and Preventing Sulfur Problem.
    2. Research Data Generation.
    3. Field Experimental Site Characterization.
    4. Soil Testing.
    5. Nitrogen Problem.
    6. Phosphorus Problem.
    7. Potassium Problem.
    8. Soil Acidity Problem.
    9. Toxicity Problem.
    10. Soil Erosion Problem.
    11. Micro Nutrients Problem.

D. No problems encountered during the quarter.

APPENDIX VA

Trip Report
Official Trip to Pammana, Wajo and
Lanrang, Sidrap
on June 7 and 8, 1983

The trip was made with Ir. Agustina Buntan, Incharge of INSFFER Trials, a cooperative project between AARD and IRRI to complete the treatments specifically the application of urea supergranules in the Nitrogen Fertilizer Efficiency on Rainfed Wetland Rice.

One of the parameters needed to be generated is the length of time spend in applying the fertilizer. In previous trials the farmer cooperators were never involved in the application of the fertilizer. The treatment calls for the application of the urea supergranules at the center of every other four hills to a depth of 10-12 cm. The trial at Pammana, Wajo gave us an opportunity to involve the farmer cooperator. It was felt essential to get his reaction especially in the ease or difficulty in applying the material (urea supergranules). The practice he had been used to in applying fertilizers was by broadcasting. In evaluating a technology in many cases the yield increase are mainly considered. The ease or difficulty of following or applying the technology was never looked into. A technology is readily adopted by the farmers not only because it increase his production but also because he can easily follow the procedure required of the technology.

Three people were employed in applying the urea supergranules namely, the farmer cooperator, Ir. Agustina Buntan and myself. The pertinent observations are presented below.

Applicator	Time spent to apply fertilizer min/plot	Computed Time man-days per ha	Yield Inc(kg/ha) needed to pay cost of application
1. Farmer cooperator	14	18	180
2. Ir. Agustina Buntan	10	13	130
3. Dr.Igmidio Corpuz	8	10	100
Average	16.7	13.7	136.7

In a 4m x 4m plot with plant spacing of 20cm x 20cm, there were 100 sites where the urea supergranules were applied.

With the farmer's rate it will require 18 man working 8 hours a day to apply urea supergranules in one hectare. The yield increase over the control should be 80 kg/ha to pay for the cost of applying the fertilizer assuming Rp. 100 as the price of rough rice per kg and a labour cost of Rp. 1000/day/person.

The reaction of the farmer on the method of application was, he found it difficult in applying the fertilizer as required (applying the material at the center of every four hills to a depth of 10-12cm).

After applying the fertilizer Ir. Buntan was shown the several missing hills in some plots. I impressed to her the need to have a uniform population as much as possible. All the missing hills in the area where experimental data will be generated, should be replanted. The plants to be used for replanting were taken from the border rows. There are two rows on all sides which serve as border rows which will not be included in the generation of experimental data.

Dr. Igmidio T. Corpuz
Soil Scientist/Agronomist-MORIF.

APPENDIX VB

Trip Report
Official Trip to Bantaeng,
Sinjai, Bone, Sidrap, Barru
and Pangkep on June 8-10, 1983

The trip was made with Ir. Lukman Gunarto, MSc, Department's Coordinator, Palawija Research Projects, Ir. A.M.P. Dg. Mattiro, research staff assigned to work on the fertilization of root crops (sweet potato and cassava) and Mr. Andrias Alik, field technician to locate and identify sites for fertilizer experiments on Palawija crops namely corn, soybean, peanut, mungbean, sweet potato and cassava.

It was enlightening to observe that Ir. Lukman and Ir. Mattiro knew the initial step in locating sites in farmers' fields.... This is the need to first contact the person in-charge of the Agricultural Extension Service in the area. The extension people are in a better position to identify the places that meet the objectives of the experiments to be set-up.

At Bantaeng, the site identified is within the general area where corn is the dominant crop. It was pointed out that there are about 1000 hectares potential for corn production in the area. The soil in the site and surrounding areas is classified as ultisol, generally a problem soil because it is acidic and low in available phosphorus.

At Sinjai four experiments will be established using corn, peanut, soybean and cassava as test crops. The site identified is in the same general area where there are now two experiments that are already established. The soil is also classified as ultisol. The treatments in the original project proposal have to be modified because the corn plants growing at the time of the visit showed magnesium deficiency symptoms. There was the need to include a treatment with

magnesium in all the experiments.

No site was identified at Bone.

At Sidrap, it was decided to establish the experiment on the fertilization of soybean and sweet potato at the upland portion of the Lanrang substation experimental farm. The soil in the substation is alluvial with a clay loam texture.

Peanut fertilization will be established at Barru where the soil is alluvial, with a sandy loam texture. Peanut is the dominant crop grown after harvesting transplanted rice.

There was the need to establish a liming experiment on soybean at Pangkep specifically at Balocci because despite the nature of the soil in the area it was pointed out that lime is being recommended for soybean. The soil in the area is derived from limestone. There is a cement factory within the area because limestone one of the raw materials needed is abundantly found in the area.

Dr. Igmidio T. Corpuz
Soil Scinetis/Agronomist-MORIF

APPENDIX VC

Trip Report
Official Trip to Parigi Substation,
Central Sulawesi on June 16 and 17,
1983

Dr. Farid Bahar, Director, Maros Research Institute for Food Crops ordered Ir. Shagir Sama, Project Leader to form a Team with him as the leader to survey Parigi Substation of Central Sulawesi. A team was formed Ir. Sama, Team Leader and Ir. Mustari, Plant Breeder and myself as members. The purpose of the trip was to gather first hand information on the soil problems, pest and disease problems and rice variety problems.

Parigi Substation is about 98 km (road distance) east of Palu, the capital of the province. It is located in a flood plain and the soil is a recent alluvium deposit. The soil has a sandy texture. However because there is indication of high organic matter to a depth of one foot the soil is fairly fertile. There had been little use of fertilizers. The standing rice crop at the time of the visit showed no sign of any soil nutrient deficiency or toxicity problem. This situation was also true in adjacent private farms.

However because of sandy texture there is the great possibility that some nutrients like nitrogen and potassium may become limiting in not so distant future. Another nutrient that may also become limiting is sulfur because the only available source of nitrogen in the area is urea. With the continuous use of sulfur-free containing materials and with intensive cropping and excessive leaching losses sulfur deficiency may occur very soon like in other parts of Sulawesi. It may not be a problem now because of the high organic matter content of the surface soil. It will definitely become a problem if nothing is done on the causes which brought about the sulfur problem in the first place.

An additional step to prevent the occurrence of soil problems in the near future is to practice shallow land

preparation in the wetland soil. Heavy machinery is not suitable in the area. Care should be employed not to plow deep in order not to break the fairly dense sandy layer about 15 inches below the surface. This fairly dense layer is preventing the rapid percolation of water which is responsible in the losses of available soil nutrients through leaching process.

Because of the availability of simple irrigation system, there is no problem producing two crops of rice in one year. A palawija crops could be grown after the second crop of rice. Because of this possibility of intensive cropping, nutrient depletion will be definitely faster.

At this point in time several of the farmers around the station mentioned that there serious problems are diseases and pests especially rats.

Dr. Igmidio T. Corpuz
Soil Scientist/Agronomist - MORIF

APPENDIX VI

Quarterly Activity Report: April-June 1983

by

SYED ANWAR RIZVI - PLANT PATHOLOGIST

1. Past Activities and Accomplishments:

1.1. Training of Personnel:

1.1.1. Provided necessary training and assistance to Ir. Shagir Sama, Head of the Entomology Department in writing up and organising a research paper draft in English entitled "Control of rice tungro virus (RTV) and its vector green leafhopper (GLH), *Nephotettix virescens* in South Sulawesi.

1.1.2. Trained Ir. Syaharuddin of the Plant Pathology Department in the application and adaptation of spray-bottle inoculation technique for the rice blast nursery screening experiments. The technique is very easy, simple to perform, requires less time to do inoculations and reduces the time required for infection development by 3-4 days when compared with the method previously used at MORIF.

1.1.3. Conducted special training sessions with Mr. Samuel of the Plant Pathology Department on the following topics in Plant Virology:

a) Form and structure of the plant viruses.
b) Review of literature on the chemical control of plant viruses.
c) The procedures involved in the purification of plant viruses.

Mr. Samuel has been proposed to go to BORIF for three month special training program to learn the purification and preparation of antisera of RTV and peanut mottle virus (PMV).

(cont.....2)

1.1.4. Necessary training was provided to Subaedah, Laboratory Assistant of the Plant Pathology Department to organise chemicals presently available in the Department in an alphabetical order, prepare an inventory list and an index card box for an easy reference/access to these chemicals when needed. This work is in the final stages of completion.

1.2. Rice Tungro Virus Experiment at Lanrang:

1.2.1. Observation were continuously made on the performance of RTV nursery screening experiments conducted during the second semester of 1982-83 research program. Assisted in the necessary data collection and the presentation of its results during the MORIF Saturday seminar sessions for the Pathology Department.

1.2.2. A new experimental design proposed by me and approved by the Head of the Pathology Department (Ir. Hasanuddin) will be used by MORIF for the first time to conduct RTV nursery field experiments at Lanrang according to an agrred-upon timetable of activities during the first semester of July-November 1983-84 research program. The new design will help improve the efficiency of the test to identify breeding lines and varieties with higher levels of resistance to RTV.

1.2.3. During the meetings held to discuss MORIF research programs for 1983-84, I presented three research proposals to investigate certain problems and find their solutions regarding RTV in Indonesia.

1.3. Acquisition of Training Materials:

1.3.1. Many research references were collected on RTV and GLH from various sources. Index cards for each reference are being typed for use by the MORIF research staff.

(cont.....3)

1.3.2. Six selected training modules and a few selected publications on special topics in plant protection (rice) were obtained from IRRI. These materials will be used during the Institute personnel's training activities and to conduct seminars on diseases and pests of rice and their control measures.

1.4. Miscellaneous activities:

1.4.1. Assisted Dr. Farid Bahar, Director of MORIF to correct the language, style and English mistakes in the draft copy of, "The third year report on cropping system research at Puriala, Southeast Sulawesi".

1.4.2. Participated in all Institute meetings, special seminars (e.g. the one on Luwu project and those given by visiting scientists), also including the Saturday Seminar series on the research accomplishment reports presented by each Department of MORIF. Assisted the Head and staff members of the Pathology Department in organising presentations of their seminars particularly research conducted at Lanrang on RTV.

1.4.3. Visited the district of Palu and Parigi in the Central Sulawesi to make an assesment of the incidence of rice diseases there and suggest to the farmers and extension staff appropriate control measures (trip report enclosed - Appendix 11.C.3)

1.4.4. Contacts were made with the Director of Research (Dr. Fachruddin), the Head (Mrs. Zaineb) and the staff Hasanuddin University of Ujung Pandang, to develop collaborative research activities in the areas of mutual interests between the UNHAS and MORIF.

(cont.....4)

1.4.5. Continued taking classes in Bahasa Indonesia so that I can communicate, as soon as possible, with my Indonesian counterparts at MORIF and also during scientific meetings.

1.4.6. Gave a seminar to Dr. Farid Bahar and two other administrative staff of MORIF, on how to manage the Institute's motor pool efficiently and effectively.

2. Problems and proposed solutions:

2.1. Communication:

2.1.1. At present, telephone or radio communication between MORIF and its sub-stations is not available for the staff to inform each other about their travel plans, sudden changes in plans, and to give or receive short messages which can help avoid travel of long duration, in addition to save money and time for other work. I strongly propose that an appropriate communication net work of its own should, as soon as possible, be provided for MORIF and its sub-stations to help improve the quality as well as quantity of MORIF research.

2.1.1. There is no direct telephone service between Ujung Pandang and MORIF. Necessary arrangements should be made with the telephone company to extend such a service to MORIF. Direct telephone connection is already available upto the airport Hasanuddin, about 10 km from MORIF.

2.2. Electricity:

2.2.1. Electricity supply to MORIF is extremely uncertain. Sometimes we get electricity only a few days a month. Many essential research projects just simply cannot be conducted without a contonuous supply of electricity. Many chemicals need refrigeration to stay effective. This situation needs an immediate improvement by providing MORIF

(cont.....5)

with a good capacity and quality generator so as to provide enough electricity of its own to, at least, run its experiments, laboratories, refrigerators and type writers when there is no supply of electricity.

3. Plans for the following quarter:

3.1. Provide assistance where and when it is needed by MORIF and its staff.

3.2. Organise training programs for staff of Plant Pathology and Entomology Departments.

3.3. Initiate my own series of seminars on special topics related to rice diseases and pests and to suggest their control measures.

SYED ANWAR RIZVI
PLANT PATHOLOGIST-MORIF.

APPENDIX VIA

TRIP REPORT - JUNE 1983

STAFF NAME : Syed Anwar Rizvi - MORIF.
DATE : June 16, 1983 - Thursday.
DEPARTURE TIME : 5.00 AM - Ujung Pandang.
PLACE(S) VISITED : Lanrang-Sub-station of MORIF.
ACCOMPANIED BY : Ir. Hasanuddin, Head, Department of Plant Pathology, MORIF.

Purpose :

1. To have discussions with Ir. Koesnang, Head of the Lanrang Experiment Station to decide on a timetable for various activities necessary to conduct the rice tungro virus (RTV) nursery screening experiment at Lanrang during the first semester of 1983-84 research program.
2. To see the condition of the nursery beds of TNI-1, already planted, as part of the first planned activity for this experiment.

Activities/Observations :

1. Ir. Koesnang was not available as he had to leave early morning at 3.00 AM to go to Maros for some urgent matter. Presently, due to the absence of radio/telephone communications between MORIF and its Lanrang Sub-station, it is not possible to inform each other about the sudden travel plans. I usually communicate one week in advance about my proposed visit(s) either through someone who is visiting Maros from Lanrang or going to Lanrang from Maros. Most times this system works but sometimes one has to face disappointment.

2. While in Lanrang we visited TN-1 nursery beds. We will inoculate these plants using RTV-carrying (viruliferous) green leafhopper (GLH) from

(Cont.....p.2)

Maros greenhouse and later on RTV infected plants of TN-1 will be used as source of infection (infector plants) in RTV nursery screening experiment at Lanrang to identify breeding lines with resistance to RTV. To meet the experiment requirements for the healthy test plants of susceptible control line, we need to plant one more nursery bed of TN-1 at Lanrang.

3. We also visited another ongoing experiment to study the effect of insecticide(s) on the incidence of RTV amongst the selected group of genetically different rice varieties with various GLH resistant genes in their background. Discussions were held on how to collect data and report results of this experiment.

We came back to Maros at 1.30 PM and met with Ir. Koesnang who had plans to return to Lanrang the same evening but he stayed overnight. He participated in the scheduled meeting at Maros on June 17, 1983 at 9.00 AM to discuss our plan of action regarding the aforementioned experiment at Lanrang. A new field screening design proposed by me and approved by the Head of the Pathology Department will, for the first time, be used to help improve the efficiency of the RTV screening test at Lanrang.

Syed Anwar Rizvi
Plant Pathologist-MORIF

APPENDIX VIB

Trip Report - June 1983

BALAI PENELITIAN TANAMAN
PANGAN MAROS

LAPORAN PERJALANAN KE SULAWESI TENGAH
22 - 23 Juni 1983

oleh

Dr. Anwar H.Rizvi dan Ir. Djafar Baco+)

PENDAHULUAN

Peninjauan ke Sulawesi Tengah, merupakan lanjutan peninjauan Team Balittan Maros pada tgl. 16 - 18 Juni 1983 yang terdiri atas Ir. Shagir Sama, Dr. Igmidio T. Corpuz dan Ir. Mustari Basir.

Pelapor tiba di pelabuhan udara Mutiara, Palu, tgl. 22 Juni 1983 pkl. 08.45. Setelah singgah di Kantor Dinas Pertanian Tanaman Pangan Propinsi Sulawesi Tengah, dengan diantar oleh Ir. Sukarui dari PPS, pelapor melanjutkan perjalanan ke Parigi. Dalam perjalanan, pelapor berturut-turut bertemu dengan Bapak Ir. Abubakar Ismail, Kepala Dinas Pertanian Tanaman Pangan Sulawesi Tengah dan Saudara Bob Siwi, Kepala Sub Dinas Perlindungan Tanaman yang telah meninjau lokasi serangan wereng coklat di Parigi. Dari mereka diperoleh keterangan bahwa keadaan serangan wereng coklat nampaknya telah dapat diatasi dengan penyemprotan insektisida. Problema yang dihadapi petani adalah hujan yang selalu turun setiap sore, sehingga insektisida yang disemprotkan di waktu pagi tercuci.

Di Parigi, pelapor menemui Saudara Usman Karim, Kepala Balai Penyuluhan Pertanian Kecamatan Parigi dan selanjutnya menuju ke lokasi serangan wereng yang dianggap paling serius.

TUJUAN

Perjalanan ini bertujuan mengadakan pengamatan serangan hama dan penyakit pada tanaman padi di Sulawesi Tengah.

+) Berturut-turut expert pada Bagian Penyakit dan staf Bagian Hama Tanaman Balai Penelitian Tanaman Pangan Maros.

HASIL PENGAMATAN

A. Di Parigi.

Di RK Bonosari, Desa Tolai, pelapor menemukan serangan penyakit virus Tungro yang cukup berat.
Menurut informasi Kepala BPP dan petani setempat bahwa varietas yang terserang tersebut adalah PB42 dan di desa tersebut terdapat kurang lebih 25 ha.
Varitas PB42 ini dimasukkan ke Parigi sekitar 4 tahun yang lalu menggantikan PB26 yang terserang wereng coklat. Hasil pengamatan yang dilakukan menunjukkan bahwa populasi wereng hijau telah sangat rendah. Selain tungro juga ditemukan populasi wereng coklat yang cukup tinggi pada PB42 dan PB54. Populasi wereng coklat disekitar serangan tungro bervariasi antara 5 - 10 ekor/rumpun serangga dewasa macroptera (yang bersayap) yang tentunya akan cepat menyebar. Juga telah ditemukan kasus lebih dari 50 ekor serangga/rumpun pada PB42. Keadaan ini menunjukkan bahwa wereng coklat telah beradaptasi pada varietas PB42 di Parigi. Di desa ini juga ditemukan tanaman padi yang oleh petani setempat diberi nama varietas GH yang belum diketahui dengan pasti asal-usulnya.
Nampaknya varietas ini belum mendapat serangan, baik wereng coklat maupun tungro. Hama yang menyerang tanaman ini adalah Hydrellia SP. Varietas PB54 dan GH baru dua musim ditanam dilokasi tersebut.

Pada pengamatan yang dilakukan di RK Karyasari (Desa Tindaki) tidak ditemukan serangan tungro. Di lokasi ini yang menyerang adalah wereng coklat. Di desa ini telah terjadi hopper-burn pada tanaman yang sudah berbuah. Menurut Kepala BPP Kecamatan Parigi dan petani setempat varietas yang telah mengalami hopper-burn tersebut adalah PB54.
Keadaan serangan ditempat ini telah dilaporkan sebelumnya oleh Ir. Shagir Sama (Pimpro dan Ajun Peneliti Balittan Maros).

Perlu ditambahkan dalam laporan ini bahwa umur tanaman padi di Kecamatan Parigi sangat bervariasi dari tanaman yang berumur kurang dari satu bulan sampai yang sementara panen.

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B. DI LEMBAH PALU.

Pada tanggal 23 Juni 1983, pada saat diskusi dengan Kepala Dinas Pertanian Tanaman Pangan dan staf, kami menerima laporan adanya serangan wereng coklat di Lembah Palu. Pelapor bersama Ir. Sukardi langsung menuju lokasi serangan di Desa Lolu Kecamatan Biromaru. Kami menemui petugas PPL dan petani setempat. Di tempat ini tidak ditemukan adanya populasi wereng coklat maupun gejala serangannya. Gejala serangan yang dilaporkan bukan gejala serangan wereng coklat melainkan penyakit blast yang cukup berat pada beberapa petakan sawah.
Untuk menghindari meluasnya penyakit tersebut, disarankan agar petakan sawah yang terserang diberantas dengan fungisida dan bukan insektisida yang sedang digunakan oleh petani setempat. Menurut petugas PPL dan petani setempat varietas yang terserang tersebut adalah PB54 (?) yang umum ditanam di lokasi tersebut. Serangan ini akan kami amati lagi pada minggu ketiga Juli 1983 yang akan datang.

DISKUSI DAN SARAN.

Pada tanggal 23 Juni 1983, pkl. 08.00 kami menemui Kepala Dinas Pertanian dan Kepala Sub Dinas Proteksi Tanaman Pangan Sulawesi Tengha. Kami melaporkan keadaan serangan hama pada umumnya, khususnya wereng coklat dan penyakit tungro di Kecamatan Parigi dan memberikan saran-saran untuk pengendaliannya. Saran-saran yang dikemukakan antara lain :

1. penggunaan insektisida yang tepat dan cepat untuk memberantas populasi wereng coklat yang terus meningkat.
2. Dianjurkan tidak menanam PB42 di daerah tersebut terutama pada waktu tanam yang tidak tepat. Untuk waktu tanam yang tepat Kecamatan Parigi telah dikemukakan oleh Ir. Shagir Sara dalam laporan perjalanannya ke Palu tgl. 17 - 18 Juni 1983.
3. Perlu mengadakan demonstrasi waktu tanam yang tepat dilapangan sehingga petani akan mudah melihat kapan tanaman akan bebas dari serangan hama dan penyakit.

Maros, 25 Juni 1983.

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APPENDIX VII

Quarterly Activity Report by Greta A. Watson,
Social Scientist / Agriculture Economist

April 1 - June 30, 1983

A. Synopsis

I took trips in early April to farming institutes and experimental stations in South Kalimantan. The last $2^1/_2$ months have been devoted to preliminary evaluation, selection, and completion of the survey for Intensification and Sustainability of Agriculture in Tidal Swamps Workshop. The survey uses an agroecosystem perspective and incorporates 6 separate disciplines and 3 subdisciplines divided among 10 persons on the team. Interim reports are completed and have been presented to concerned parties.

From June 24 to July 2 I spent time on official business in Jakarta / Bogor. This included time gathering references for bibliography of coastal swamp areas, meetings with authorities on agriculture and environment of coastal, tidal, and tidally influenced regions. The visit also included meetings at Ford Foundation (see July report).

B. Activities

1. Consultations

9 May	Dr. Ibrahim Manwan, Dr. Soewardjo, Dr. William Collier, AARP RI-USAID team.
24 June - 2 July	Dr. William L. Collier, RMI AARP RI-USAID, Dr. Jerry McIntosh and Dr. Ritchie Cowan CRIFC - IRRI, Mr. David McCauley, Ford Foundation and others.

Other consultations included in general report.

2. Field Trips

9 April	Belandean Res. Stat. (BARIF) - see work report WR 003

12 April	Pleihari Res. Stat.(BARIF) - See WR 004
13 April	Lambung Mangkurat University, KALSEL - See WR 005
15-16 April	Sungai Buluh, and Tilang Stat. (BARIF) - See WR 006
18 April	Handil Manarap Res. Stat. (BARIF) - See WR 007
19-20 April	Tidal Swamp Settlements, South and Central Kalimantan - See WR 008
25 April	Dinas Pertanian, Dinas Perkebunan and Badan Meteorologi dan Geofisika, Banjarbaru - See WR 009
14-16 May and 28-31 May	Purwosari I, Purwosari Baru, Tamban Raya : Preworkshop Survey, South Kalimantan - See WR 011
21-23 May and 3-6 June	Tamban Lupak and Lupak Dalam : Preworkshop Survey, Central Kalimantan - See WR 012
24 June to 2 July	Trip to Jakarta and Bogor - See July report

3. Seminars given :

   a. Water Conditions in Coastal Wetlands in South and Central Kalimantan

   b. Analysis of Farming Systems in Tidal Areas : An Agroecosystem Model

   c. Research and Methodology for Workshop Presurvey in Tidal Areas

   d. Graphs and Scale Maps : Construction and Utilization

   e. Report Writing and Organization

4. Organized, coordinated and implemented and helped design research for the pre-workshop survey on tidal swamp settlements

5. Compiled a monograph in a report format on pre-workshop survey. Wrote general introduction to villages, methodology and other sections. 250pp.

6. Reviewed, editted and/or aided in translation of various articles written by BALITTAN employees.

Plans for Third Quarter 1983

1. Write a paper on peat and acid sulfate soils problems in Kalimantan with Dr. H. Anwarhan.

2. Participate in Tidal Swamps Workshop on Intensification and Sustainability of Agriculture 16 - 22 July 1983. Help write-up final report.

3. Complete a draft bibliography on tidal and inland swamps

4. Assist in preparation of proposal on agroecosystems survey of food crops in coastal swamp region.

D. Problems and Proposed Solutions

A. Lack of laboratory equipment for soils and water testing.

B. Lack of qualified consultants in soils, weeds, plant pathology, hydrology and rat control. The alternative to this problem may be short term rather than longterm consultants. Since part of the multimillion dollar SWAMPS II fund may become available to BALITTAN in 1984, it is especially important that researchers be well trained.

APPENDIX VIIA

WR-016

To : AARP - GOI Project, RMI

From : Greta A. Watson

Subject : Agro - Ecosystem Pre Workshop Survey for Tidal Swamp Workshop : Survey II of Purwosari I, Purwosari Baru, Tamban Raya, Kalimantan Selatan. Map-making and Observation Survey.

Date : 28 - 30 May, 1983

Participants :

G.A. Watson, coordinator; Ir. H. Rumansyah Itjin; H. Tairan Sarimin; Ir. Mahrita Willis; Ir. Hairunsyah; Ir. Eddy Purwanto; Ir. Yanti Rina; Ir. Syamsu Noor; Ir. Hidayat Djumhana Noor; Thomas M. Gula, MA, consulting entomologist and photographer.

Objectives of Visit :

This was the second survey of the Purwosari I, Purwosari Baru, and Tamban Raya government sponsored and spontaneous transmigration sites in South Kalimantan. The purpose of this survey was to create detailed maps of environmental and social parameters of each village, to collect samples of soil, water and insects for future analysis, and to make firsthand observations of the constraints to agriculture and other farming system livelihoods.

Description of Research Methodologies :

The team members met to discuss objectives of the second survey to the South Kalimantan sites. The coordinator gave a seminar on the basics of map-making and graphing of data. She presented team members with scale maps of each village which she had constructed. Responsibility for final creation of observational maps and graphs was allocated to individual team members, who in turn coordinated information gathering by ancillary workers. Each discipline also compiled a list of photographs of areas, objects or situations which would insure adequate visual presentation of their materials.

Team members were divided into three groups of three for the survey. Each team covered approximately one-third of the area of each village, including rice fields, coconut groves and settlements. In this way, the team could derive a representative picture of the village as a whole. Spontaneous interviews were carried out with farmers in the field, and the village head, family and others were questioned in depth.

Description and Comparison of Sites, Survey II Along the Major Tamban "River", South Kalimantan.

Purwosari I. Purwosari I has the least area of all villages, approximately 2½ km x 3½ km at its widest and longest points. Only three of its seven canals have footpaths; the rest are impassible except by dugout canoes. Most settlement occurs along canals with footpaths from 0 - 1½ km from the Tamban "River", *and on the major road along this "river". At least 60% of the village is comprised of coconut groves, and the remaining portion is divided equally between rice and rice planted between young not-yet-bearing coconut trees. Farmers attribute low rice yields (approximately 1 - 1.5 tons of unhusked rice per hectare) to acid soils and inadequate drainage. Secondary canals often do not feed directly into primary canals.

Coconut groves, especially along canals only navigable by dugouts, are very weedy. The planting of secondary cover crops in these areas, such as banana, citrus and jambu trees and cassava helps inhibit weed growth by reducing sunlight to the forest floor. Farmers contend that conversion from rice to coconut is the only profitable cropping system, since coconut mounds are subject to leaching while rice fields are not.

On casual survey, farmers plant areas between coconut trees and on mounds in rice fields fairly densely with secondary crops. This planting continues through the limits of the coconut groves, and may be dependent on 1) long establishment of settlement (1938) and 2) low population to land ratio-approximately ¼ha. land per person.

Purwosari Baru. Purwosari Baru has approximately 3 times the land area of Purwosari I, and is 3 x 7 km at its widest and longest boundaries. Settlements are primarily on two major canals and along the Tamban River. Of its nine major canals, all except one have foot paths although some paths are more easily walked than others. In areas further from the Tamban "River", some canals are difficult to navigate by canoe because of weeds in the water. Purwosari Baru is predominantly planted in rice; only the first kilometer or two from the river is densely planted in coconut (approx. 4 km^2).

Rice fields have variable yields depending on their location. On canals closer to the river, yields may reach 2 to 2.5 tons per hectare. This is

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* The Tamban Anjir is a canal and not a river, but in order to distinguish this canal from secondary canals leading into villages, it will be referred to as a 'river'.

apparently a product of adequate drainage and soil type. Yields on fields 4 or more km. inland may be under one ton per hectare. Although much of the rice field area is called "rice field", at least 1 km^2 is not presently cultivated because of lack of adequate drainage and non-leaching of acids from soils and water.

Coconut groves, especially those further from house, have dense undergrowths of weeds. Many rows are not suffiently elevated for healthy growth of coconut : five and six year old trees are not yet bearing fruit. There are secondary cover crops, such as banana or fruit trees, planted on rows between coconuts. These are sparse plantings. Less intensive cropping in these areas may be associated with higher individual to area ratio (approximately ½ ha^2 per person).

Farmers say that rice is a more profitable crop than coconut. In areas which yield 2 - 2.5 tons of unhusked rice per hectare, and in soils which are only slightly acid, this appears to be true. In areas subject to iron toxicity or acid sulfate conditions, these constraints must be removed productive agriculture can be carried out at all.

Tamban Raya. Tamban Raya is 3 km wide by 7 km in length. All canals have footpaths, but many of the roads are impassible after 4 kilometers, due to fires which swept the rice fields and literally ate up the soils during the last dry season. Settlement is primarily along the Tamban "River" and to 1½ kilometers inland along several major canals. Almost all canals are shallow from 3 to 7 km inland. Coconut groves extend about 1 km. to the interior of the village; after this, the groves give way to rice fields, small 'islands' of banana, and secondary 2 - 4 year regrowth.

Rice yields vary from less than 1 to 3,2 tons of unhusked padi per hectare. This extreme variability is due in part to the drainage system. Many areas are acid and approximately 15 - 25% of the wet lands are not cropped. Severe acidity is evident about 6 km inland. There is little organized village labor on canals. However, variability on less acid soils is often the result of lax management : farmers who work less and use fewer inputs have poorer yields.

Coconut groves are weed infested. The secondary crop in this area is banana : citrus trees are also planted but have not yet begun to bear well. Farmers are reluctant to plant more land in coconut because peaty soils subject newly planted groves to the threat of fire in the dry season.

Since there is an average of almost 2/3 ha^2 of land for each individual, the situation at Tamban Raya first appears more favorable than the situation

at either Purwosari Baru or Purwosari I. However, disproportionate land allocations and extreme acidity of soils create problems for the small farmer.

Conclusions :

The data derived from direct observation in the field clarified and complemented that derived from interviews during the first survey.

Comments :

This second survey in Purwosari I, Purwosari Baru and Tamban Raya presented move problems than the first survey. During the first day of the survey it rained continously. Many photographs could not be taken, paths became flooded, and team members were not equipped with rainwear. All villages had some areas which were inaccessible either by foot, canoe, or both : complete field surveys were untenable.

Organization of the survey was difficult. Perhaps owing to lack of time (3 days preparation), many team members did not present methodologies for their respective surveys according to schedule, acquire needed books or materials, or adequately consult either with the coordinator or their survey leader. This caused a late departure the day of the survey which also prevented team members from collecting data on village markets.

APPENDIX VIIB

WR-017

To : AARP - GOI Project, RMI

From : Greta A. Watson

Subject : Agro - Ecosystem Pre Workshop Survey for Tidal Swamp Workshop : Survey II of Tamban Lupak and Lupak Dalam, Central Kalimantan. Map-making and Observation Survey.

Date : 3 - 6 June, 1983

Patticipants :

G. A. Watson, coordinator; Ir. H. Rumansyah Itjin, leader; Ir. Hairunsyah; Thomas M. Gula, MA, entomologist and photographer; Ir. Suriyanto, Ir. Syams Noor, Ir. Yanti Rina, Ir. Ismadi, Ir. Mahrita Willis, Ir. Rachmadi.

Objectives of Visit :

This was the second survey to Lupak Dalam and Tamban Lupak, Central Kalimantan. Its purpose was to create detailed maps, take samples and make observations of environmental and social parameters within each village. Agriculture and other farming system livelihoods were directly observed. Description of research methodologies may be found in previous 28 - 30 May Survey II Report.

Description and Comparison of Sites, Survey II : Lupak Dalam and Tamban Lupak

Tamban Lupak . A government-sponsored transmigration project, Tamban Lupak is approximately 5 km long by 1¼ km wide. A 1 - 2 m deep primary canal stretches the length of the project, and at each 400 m is intersected by a 1 - 1½ m deep secondary canals running the width of the project. Ten government-constructed houses are evenly spaced within each secondary canal complex, but settlement has changed with population growth and house construction by new families within the transmigrant. The site is intersected at secondary canals 4 and 5 and 8 to 12 by indigenous settlements. Tamban Lupak also includes another site not covered by this survey.

The major crop is rice, but both production and intercropping vary in relation to soil and water contingencies. Yields range from 1 - 1.5 tons unhusked rice per hectare in low-yielding fields to 2 to 2.5 tons in moderate-yielding fields. Higher yields in the latter area seems quite possible with sufficient rat and stemborer control. From secondary canal 5 through 12, cassava is a major crop. Coconut has been planted in this area and remaining rice crops now planted between these trees will be phased out as the coconut canopy increases. There is some intensive sweet potato and green bean production

Farmers also derive limited income from fishing. Soils are more peaty and/or more acid than areas lying closer to the river. Farmers complained that inadequate drainage of peat reduces yields.

Along secondary canals 1 to 4, rice is still the predominant crop. However, much rice land has gone to fallow due to the salt influx and consequent increased mortality in rice earlier in the year. Farmers also plant coconut, banana, cassava and clove trees, mostly along paths and to short distances within fields.

Spontaneous interviews among farmers indicated that most settlers do not derive income primarily from farming, but must seek off-farm labor to meet subsistence needs. This problem can only be expected to worsen with increasing populations and limited land areas (512 ha. for a population of 1444 persons, or approximately 1/3 ha. per person). For the time between which no rice can be planted and coconut trees do not yet bear abundantly, this situation will probably result in the increasing seasonal migration of a large proportion of male adults.

Lupak Dalam. The loosely-knit "village" of Lupak Dalam actually stretches about 20 km along the Kapuas River and up to 8 - 10 km into the interior. This area is far too largefor the survey team to assay. An area of major settlement and of similar environment to Tamban Lupak was therefore chosen for observation and measurement. This area is directly north of the Tamban Lupak site and includes an area 3½ km wide by 5-8 km long. Our team's three groups surveyed three types of land : tanah pasang surut (direct tidally influenced), tanah pematang (higher land-some indirect influence) and tanah rendah (lowland-indirect tidal influence). The three areas of Lupak Dalam varied considerably. Direct tidally influenced lands near the Kapuas River are planted in older coconut groves. Behind these groves are fields. Further from the river. These fields give way to the higher lands. Here citrus trees, cassava, banana, coconut and vegetable crops predominate. The high lands slope down to freshwater indirect tidally influenced rice fields. Each of these areas thus has a particular cropping pattern and a related set of constraints and pests. Settlement however, mostly occurs near the sea along the Lupak Dalam River.

Rice fields in Lupak Dalam, whether near or far from transmigrants' fields, appear to be greener and healthier than those at the Tamban Lupak site. There is less cassava production, but this is more than compensated by citrus, banana and vegetable gardening. Farmer engage in more vegetable and fish sales, too.

Resident seem more responsive to potential of different land areas.

Of all five desas in our tidal swamp survey, Lupak Dalam has the largest area. Surprisingly, however, there is little disproportionate land "ownership" : all farming families have farming rights to between ½ and 5 hectares of land. Additionally there is still land available to be opened by local residents or newcomers. Javanese transmigrants, although legally permitted to buy rights to Lupak Dalam land, are not encouraged to do so. Lupak Dalam residents feel, and somewhat justifiably, that transmigrants have already acquired the Tamban Lupak site from them, and have received far more government aid in housing, canal construction and living allowance than they, the indigenous inhabitants, have.

Conclusions :

Surveys of Tamban Lupak and Lupak Dalam revealed that economic prosperity seems to be related to : 1) adjustment and modification of cropping systems according to environmental factors 2) diversification of farming system activities 3) amount and type of lands farmed. The future success of the Tamban Lupak transmigration project relies on the improvement of the farming system in the above areas.

Comments :

The research team was better organized for this survey than the last. There is still some information which must be gathered for both sites on the final survey, but this is minor.

This week team members will gather to assess results of the surveys and begin writing reports. I will hold a seminar on report-writing. Team members will discuss their various findings and help each other construct maps of the environmental and social parameters of their fields. The reports from the team for each research area and each village surveyed will be typed up and prepared as an interim report monograph in the Indonesian language. This monograph will be presented to Dr. Ibrahim Manwan, GOI; Dr. William Collier, AARP RI-USAID Coordinator at RMI, and Dr. Hans Anwarhan, BALITTAN Banjarmasin.

APPENDIX VIII

Quarterly Activity Report by Kevitt D. Brown,
Deepwater Rice Breeder

1 April - 30 June, 1983

A. Activities

1. Consultations

2 May - 7 May	Dr. W. Collier, RMI/AARP, Dr. B.H. Siwi, BALITTAN Bogor, Dr. J.R. Cowan, IRRI, in Bogor, and Dr. Bambang, BALITTAN Sukamandi

Other consultations included in general report

2. Field trips

9 April	Belandean Res. Stat. (BARIF) - See Work Report 003
12 April	Pleihari Res. Stat. (BARIF) - See WR 004
15-16 April	Sungai Buluh and Tilang Res. Stat. (BARIF) - See WR 006
18 April	Handil Manarap Res. Stat. (BARIF) - See WR 007
19-20 April	Tidal swamp settlements, South and Central Kalimantan - See WR 008
2 - 7 May	Trip to Bogor and Sukamandi - See WR 010
28 May	Belandean Res. Stat. (BARIF) - See WR 016
7 June	Handil Manarap Res. Stat. (BARIF) - See WR 015
9 June	Belandean Res. Stat. (BARIF) - See WR 016
28 June	Belandean Res. Stat. (BARIF) - See July report

3. Began monthly rice breeding meetings at BARIF and discussed ways for researchers to improve their research.

4. Began crossing program with rice. Four people were trained.

5. Silica gel was acquired and is presently used to store important breeding materials at BARIF.

6. Four research substations were visited and assessed for improvements in plant breeding research.

7. Tidal swamp villages were visited and conditions discussed in preparation for tidal swamp workshop in July.

8. I served part time as head of party in Banjarmasin in the absence of Dr. Bolton. The administrative assistant was trained to handle

bookkeeping, and office and personnel policies were set.

9. Collected data from dry season experiments.

B. Plans for Third Quarter, 1983

1. Complete crossing program in July and collect dry season field data. Prepare for wet season and further organize plant breeding research

2. Prepare draft of manual to be used by data collectors at BARIF in all plant breeding experiments

3. Participate in July tidal swamp workshop.

4. Hold monthly meetings and begin organization of secondary crops program with Sara Brown and BARIF staff.

C. Problems and Proposed Solutions

1. There is a need for a fully irrigated rice field for increasing BARIF seed and making crosses. The exact proposal will be written and discussed with Dr. Anwarhan.

2. There is need to improve various farm facilities : canals and weather recording equipment in Banjarmasin, dikes in Belandean, irrigation in Pleihari, bird and rat control in all sites. These needs will be discussed with Dr. Anwarhan.

3. Seedbeds were poorly managed and seed germination was very poor this season. We will concentrate our research and administration to solve these problems.

To : AARP - GOI Project
From : Kevitt Brown
Subject : Trip Report to Belandean
Date : I. 28 May 1983
II. 9 June 1983

First Trip : 28 May 1983

Party : Ir. Suhaimi S. Msc, Ir. Mauliana D, Ir. Nurul Aida BA, Sara and Kevitt Brown

Purpose : To check the outcome of the dry season transplanting of breeding trials and take data on flooding survival of some experiments.

Second Trip : 9 June 1983

Party : Dr. H. Anwarhan, Ir. Suhaimi S. Msc, Ir. Mahrita W, Ir. Eddy Purwanto, Ir. Yanti Rina, Kevitt Brown

Purpose : To see the station after the installation of the new farm manager, to discuss with the Head of BALITTAN ways to improve research there and to collect seedling scores on several experiments.

Station Survey

There were seven experiments (six in plant breeding) in Belandean this season including two held over from last year. The results of these experimental plantings were rather disappointing and prompted personal discussion with Dr. Anwarhan. The following problem areas were identified and dealt with :

1) Poor seed germination : Almost every experiment was seriously reduced in size because of poor germination of some lines. In one experiment only two lines survived out of five, and often the check variety did not germinate, causing the experiment to be less useful.

The reason for poor germination is only partly technical despite the fact that the system of seed storage presently used

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is inadequate. The main problem appears to have been poor management. Freshly harvested seed must be sun dried immediately to 14% moisture before storage. At least every three months thereafter the seed must be re-dried in the sun. This practice, presently recommended by BARIF should be successful even without any improvement in seed storage but apparently has not been followed. Technically we will have installed a silica gel storage system in Banjarmasin station before the middle of this month. Also we must stress the importance of taking seed moisture readings on a routine basis. Besides this it will be difficult to keep good seed in Belandean because the soil and peat conditions in the field greatly reduce the quality of seed before harvest. Nevertheless Dr. Anwarhan has assured his support of research staff to improve the supervision of farm personnel and to improve seed storage.

2) Drought in the seedbeds : A few experiments were severely affected by drought in the seedbed. In one trial only 323 lines survived out of 500. The seed beds were compacted and there were no supplemental additions of water. This year the low rainfall especially aggravated the situation since one month seedlings were too short for transplanting. Technically, I recommend odding compost to the seedbeds and for station personnel to give careful attention to watering seedbeds once or twice daily on rainless days. Dr. Anwarhan has again assured us of administrative support.

3) Poor communication between research and farm staff : One of the breeding nurseries was <u>not</u> located in the field for which it was chosen. This is serious because the purpose was to test the materials under heavy peat conditions and the result was a lesser soil stress than desired. A more clear and formal channel is needed to pass all information to and from the farm stations. A writer record of request for field space, and special management operations should be submitted to both the farm and Banjarmasin for later referral and follow-up. Presently there is some informal communication which can lead to unfortunate consequences if not property followed up

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Another idea to improve technical and management communication is for the Director of BARIF, Project Leader, and other responsible persons to make more regular visits to the substations. Dr. Anwarhan immediately joined us in our second visit to Belandean and has vowed to visit each farm station once per month as far as that is possible.

Also I proposed that rather than have each researcher be in charge of experiments spread over several sub-stations it would be better that each researcher have all of his experiments concentrated at one or two stations. This should allow better supervision of experiments because of more frequent visits to a given substation by each researcher. Dr. Anwarhan tentatively agreed to this idea which we will discuss further to investigate details of its implementation.

4) Station mismanagement : There had been allegations of mismanagement by the former farm manager of Belandean. This month Dr. Anwarhan replaced the farm managers at a few sites with men of higher educational qualifications. The new manager in Belandean, however, was chosen among the junior technicians, but in this case I agree that he should do a fair job.

Belandean Station Improvement

Dr. Anwarhan held a discussion with station personnel at Belandean to discuss improvement in research and farm operations. There were six workers present from the station . Two additional SMA graduates were requested. The importance of management for bird and rat control were mentioned and drying of seed and watering of seedbeds. Dr. Anwarhan also suggested that a system of permanent levees be constructed. This is a good idea because the variability within fields of our present experiments is very high and may be improved by the establishment of permanent fields.

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Experimental Data

We observed an agronomy experiment looking at the effect of single vs double transplanting and seedling ages. The experiment was near harvest. A single planting of fourty day seedlings was equal or better than double transplanting of twenty five day seedlings. Also IR42 was better than Mahakam and IR50 under the field conditions. This experiment suffered greatly from birds, rice bugs and helminthosporium disease.

In a variety trial of nine lines replicated three times two lines were observed to be better than the IR42 check at the flowering stage : B 6306 b-Kp-40-1-1-3-3 and B 3770 d-Pn-233-3-3.

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APPENDIX VIIIB

WR-018

To : AARP - GOI Project
From : Kevitt D. Brown
Subject : Trip Report to Handil Manarap
Date : 7 June 1983

Party : Dr. H. Anwarhan, Ir. Suhaimi S., Tairan, Pauja, and K. Brown

Purpose :

To check up on the status of B1050c-Mr-18-2 seed harvested in the first crop and to install the new farm manager.

This short trip was useful to communicate the importance of maintaining the quality of seed harvested from the newly released variety from Banjarmasin, "Mahakam" formerly refered to by its breeding line numbers B1050c-Mr-18-2. Between 4 and 4.6 tons of cleaned padi were harvested in Handil Manarap over a total area of about 4 ha. This low yield can be attributed to birds, late transplanting when the water level was too high and nemotode and soil problems.

When we looked at the seed, the moisture meter at the station indicated less than 10% moisture after remaining inside for two weeks after sun drying. A sample was returned to Banjarmasin for confirmation where the new moisture content read 11%.

Dr. Anwarhan congratulated the personnel at Handil Manarap for their attention to the new variety and encouraged them to work hard. The old station manager was exchanged for Ir. Murjani Imbran. He is better educated and from the Handil Manarap area but is younger. There were 12 workers present at the station when we arrived.

My conclusion is that we will need to improve our seed increase ability. To do this we will need a well managed fully irrigated area for all our programs, upland as well as wet rice. This is vital for the future of our program. Our present main seed increase stations are Handil Manarap and Binuang but these are not fully irrigated.

APPENDIX IX

LIST OF AARP/RMI PARTICIPANTS AS OF JUNE 30, 1983

No.	N A M E	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTIONS/COUNTRY	DURATION
	DEPARTURES				
1.	Waluyo Subani	MRFI/Jakarta	Library Training	International Center for Living Aquatic Res. Mgt. in Manila	June 6 - July 6,1983
2.	Endang Pratiwi	CRDIF/Jakarta	do	do	do
3.	Rackhmat	NAL/Bogor	do	do	do
4.	Tuti Sulasmi	NLAS/Bogor	do	do	do
	CONTINUING IN TRAINING:				
5.	Novenny A. Wahyudi	RIIF/Bogor	Aquaculture Trg.Prog.	Auburn University Alabama, USA	March 18 - July 15,83
6.	Purwito Martosubroto	RMIF/Jakarta	A&D Mngt.Consultancy Workshop	Denver Res.Inst.Denver Colorado, USA	May 23 - July 01,83
	RETURNEES:				
	Ati Sri Duriat	LERIH/Lembang	Elisa Technique	American Type Culture Center in Rockville Maryland, USA	Feb.20 - June 9,'83
.	Nani Sumarni	LERIH/Lembang	Interdisciplinary research in Plant Breeding	Asian Vegetable Res. & Dev. Center,Taiwan	Nov.07 - May 07,'83
.	Etti Purwati	do	do	do	do
0.	Yoyo Sulyo	do	do	do	do
1.	R.E. Suriaatmadja	do	do	do	do
2.	Kosasi Kadir	FPRI/Bogor	Woodworking & drying & research proj. planning & evaluation	Forest Products R&D Inst. Los Banos, Philippines	March 7 - April 7,'83

NO.	N A M E	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTIONS/COUNTRY	DURATION
13.	Mas Ismunadji	BORIF/Bogor	Spec.Trg. in upland crops physiology	Asian Vegetable Res. & Dev. Center, Taiwan	Nov.11 - Dec. 01,83
14.	Mochamad Sirdan	CARP/Jakarta	Project Preparation & Evaluation in Ag. and Rural Development	Statistical, Economic & Social Research & Trg. Center for Islamic Countires, Turkeu	Oct. 18 - Nov. 12,83
15.	Syafril Lamsayun	CARP/Jakarta	Procurement Training	TransCentury Corp,USA	Oct. 15 - Nov. 14,83
16.	Abdussamad Syahrani	BARIF/Banjarmasin	do	do	do
17.	A.M. Laponangi	MORIF/Maros	do	do	do
18.	Warsito Hutomo	CAQ/Jakarta	Agric.Proj.Planning & Analysis, Section II	USDA, Washington,DC	Sept.7 - Nov. 11,82
19.	Mohamad Mansur	CRIIC/Bogor	Agric.Proj.Planning & Analysis Section II	USDA,Washington,DC	Sept.7 - Nov. 11,82
20.	Hafni Zahara Syukri	CARP/Jakarta	do	do	
21.	Wahyadi Sosrowardojo	CRIFI/Jakarta	Applic.and Diffusion of Agric.Research Results to the Community Level.	Iowa State Univ.USA	Aug.25 - Oct.1,82
22.	Sofyan Ilyas	RIFT/Jakarta	Determination & Prevention of Post-harvest Food Losses	Cornell Univ. USA	Sept. 6 - Oct.13,82
23.	Achmad Hidayat	CAQ/Jakarta	Plant Quarantine	USDA, Washington,DC	July 19 - Sept.17,82
24.	Dewa M. Tantera	BORIF/Bogor	Integrated Pest.Mgnt.	Purdue Univ. USA	June 9 - July 23,82
25.	Sudiarto	CRIIC/Bogor	Agric.Research Method	Kansas State Univ.USA	May 31 - July 23,82
26.	Lalu Sukarno	BORIF/Bogor	do	do	do
27.	Siti Sufiani	MORIF/Maros	do	do	do
28.	M. Saleh Pandang	MORIF/Maros	do	do	do
29.	Wafiah Akib	MORIF/Maros	do	do	do
30.	Tambak Manurung	CIRIAS/Bogor	do	do	do
31.	Didi Suardi	CRIFC/Bogor	do	do	do

NO	N A M E	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTIONS/COUNTRY	DURATION
32.	Yono C. Rahardjo	CRIAS/Bogor	Agric.Research Method	Kansas State Univ.USA	May 31 - July 23, 82
33.	Budhojo Sukotjo	Prof.and Proj. Form Unit Jakarta	Agric.Research Mngt.	Washington,DC and Hawaii, USA	June 6 - 12,82 June 18-21,82
34.	Tambunan SM Manungkol	BORIF/Bogor	Estab. Data Bases & Analit. Syst. for Econ. Decision making in Agric.	University of New Mexico	June 6 - Aug. 13,82
35.	Rachmat Kartapradja	LERIF/Lembang	Veg. Crop.Prod. and Market	Rutgers Univ. USA	July 12 - Aug.20,82
36.	Artaty Wijono	CRIFI/Jakarta	Ag.Comm. & Med. Strategy	Iowa State Univ. USA	July 12 - Aug.20,82
37.	Abisono	TARII/Tg. Karang	do	do	do
38.	Adi Widjono	CRIFC/Bogor	do	do	do
39.	T.H. Mangunsong	Reg.Ag. Quarant/ Jkt	do	do	do
40.	Fathan Muhadjir	BORIF/Bogor	Wheat & Maize Phys.	CIMMYT, Mexico City	July 20 - Aug. 25,82
41.	Nurlaila Hasbullah	BARIF/Banjarmasin	Rice Production	IRRI, Philippines	July 1 - Aug. 27,82
42.	Nurul Aida	BARIF/Banjarmasin	Rice Production	IRRI, Philippines	July 1 - Aug. 27,82
43.	Achmad Dimyati	BORIF/Bogor	Tech. & Econ. Aspects of Soybean Production	Univ. Illinois, USA	May 10 - Aug. 6,82
	TRAINING OUTSIDE RMI CONTRACT:				
44.	Achmad Sarnita	RIIF/Bogor	Study Milkfish Cultiv. Methods	SEAFDEC/Philippines Institute of Marine Biologi and Gulf Coastal Fisheries Center/USA	July 5 - Aug. 15, 81
45.	H a n i a h	do	do	do	do
46.	Suningrat	NIAS/Bogor	Regional Micrographic T. Course	SEARCA/Philippines	Jan. 10 - 23,82
47.	Sunardi Dahlan	do	do	do	do

NO	N A M E	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTIONS/COUNTRY	DURATION
48.	Azis Arifin	LERIF/Lembang	The Decimal Long of Cip. Comperative Study for Tuber Crops Research Comparative for Wheat Research	Pery CIAT/Columbia CIMMYT/Mexico	Feb. 22 - 26, 82 Feb.29 - March 1,82 March 3-4,1982
49.	Surhahmat Kusumo	CRIFC/Bogor	do	do	do
50.	Sundaru	BORIF/Bogor	Management Agric.Organ	USDA/USA	May 17 - July 9,82

APPENDIX X

REPORT ON VEGETABLE PRODUCTION COURSE AT AVRDC - TAIWAN

Nani Sumarni
Etti Purwati
Rustaman Soeriaatmadja
Yoyo Sulyo

Training proceeded from 7 November 1982 to 6 May 1983. Training at AVRDC is grouped in:

- Vegetable Production Course
- Research Intern
- Research Fellow
- Research Scholar

We were entered as Research Interns, with our respective programs as follows:

Ir. Etti Purwati - Plant Breeder

a. Tomato breeding, F_3 and DC_3 bulk population

b. Tomato breeding planting plan F_3 pedigree lines

Advisor: Romeo T. Opena.

Ir. Rustaman Soeriaatmadja - Entomologist

a. Screening insecticides for tomato fruitworm control

b. Screening segregating material for tomato fruitworm resistance

c. Screening insecticides for Chinese cabbage and common cabbage insect pest control

Advisor: Dr. N.S. Talekar.

Ir. Nani Sumarni - Agronomist

a. Effect of Nitrogen and Soil Additive "Agrispon" on growth and yield of tomato.

Advisor: Dr. Adisok Sajjapongse.

Ir. Yoyo Sulyo MS - Plant Pathologist

a. Study on tomato leaf curl disease from Taiwan

Advisor: Dr. Sylvia K. Green.

In addition to the above programs, we also took field trips to agricultural areas, agricultural produce factories and visited agricultural research institutions, including:

- Food Industry Research and Development Institute
- Land Reform Training Institute at Tooyuan
- Fenghson Fruit Research Institute
- Sakata Seed and Knownyou Seed Companies
- Hsilo Vegetable and Fruit Market
- National Taiwan University
- District Agriculture and Information Service
- Taiwan Protection Research Institute
- Taiwan Seed Service

Training at AVRDC Taiwan has advantages for research staff, including:

- additional experience in agricultural management
- comparative study in agricultural management
- additional experience in scientific discussion
- additional knowledge in scientific writing method
- learning research management.

Suggestions for improvement

- For sending trainees in the future, trainees must know the program and training schedule before departing for AVRDC so there is preparation.

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