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AGENCY FOR AGRICULTURAL RESEARCH AND DEVELOPMENT

RMI

ELEVENTH QUARTERLY NARRATIVE REPORT ON THE APPLIED AGRICULTURAL RESEARCH PROJECT

FOR THE MONTHS

OF

OCTOBER, NOVEMBER, DECEMBER

1984

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ELEVENTH QUARTERLY NARRATIVE REPORT

ON THE

APPLIED AGRICULTURAL RESEARCH PROJECT

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LIST OF AARP/RMI SHORT TERM TRAINING PARTICIPANTS AS OF DECEMBER 31, 1985.

I. INTRODUCTION

In this quarter the technical assistance team was joined by Dr. Joel Levin who is assigned to the Research Institute for Animal Production in Bogor. With his arrival the technical assistance team is complete except for the two forestry experts.

II. PERSONNEL

In order to demonstrate the entire range of activities performed by the experts, this quarterly report will first give an outline of all their activities since they began their assignments. Next, this quarterly report will give a detailed description of each ones activities for their assignment and the future programs of those experts who will be extended.

A. OUTLINE OF ACCOMPLISHMENTS AND FUTURE PROGRAM

1 William L. Collier - Chief of Party
- 1.1 Accomplishments
  - 1.1.1 Assistance to the Team Leader (W)
  - 1.1.2 Assistance to the Secretariate
    - 1.1.2.1 Development of Swamps II (W)
    - 1.1.2.2 Development of Upland Agriculture (W)
    - 1.1.2.3 Development of Eastern Indonesia (W)
    - 1.1.2.4 Assistance on Speech Writing and Papers (W)
    - 1.1.2.5 Kepas (W)
    - 1.1.2.6 Project Management (W)
  - 1.1.3 Assistance to the Director General (W)
  - 1.1.4 Management of AARP/RMI Experts (W)
  - 1.1.5 Computer Purchase (W)
  - 1.1.6 Assistance to Procurement and PSA (W)
  - 1.1.7 Detailed plan and PACD Extension (W)
- 1.2 Future Program
  - 1.2.1 Project Management, Monitoring and Evaluation (W)
  - 1.2.2 Micro Computer Training Program (W)
  - 1.2.3 Computer Use at Research Institutes and Secretariate (W)
  - 1.2.4 Assistance to Swamps II (W)
  - 1.2.5 Management of Technical Assistance (W)

2 Carl R. Fritz - Training Officer
- 2.1 Accomplishments
  - 2.1.1 Administrative Specialist (W)
  - 2.1.2 Managing Short Term Training Abroad (W)
- 2.2 Future Program
  - 2.2.1 Managing Short Term Training Abroad (W)
  - 2.2.2 Managing In-Country Training Workshops (W)
  - 2.2.3 Managing English Language Program (W)

3 Moestadjab - Administrative Specialist
- 3.1 Accomplishments
  - 3.1.1 Administration of Project (W)
  - 3.1.2 Assistance to Team Leader (W)
  - 3.1.3 Assistance to Financial Officer of AARP (W)
- 3.2 Future Program
  - 3.2.1 Administration of the Project (W)
  - 3.2.2 Assistance to the Team Leader (W)
  - 3.2.3 Assistance to the Financial Officer of AARP (W)

4 Roland Harwood - Farm Development Specialist
- 4.1 Accomplishments
  - 4.1.1 Monitoring of Construction (W)
  - 4.1.2 Assistance to Station Design (W)
  - 4.1.3 Preparation of Procurement Lists (W)
  - 4.1.4 Creating an Awareness of Station Management (W)
- 4.2 Future Program
  - 4.2.1 Monitoring of Construction (W)
  - 4.2.2 Assistance to Station Design (W)
  - 4.2.3 Preparation of Procurment Lists 2 and 3 (W)
  - 4.2.4 Design and Preparation of Station Farms (W)
  - 4.2.5 Pilot Project and Short Term Training on Farm Development
  - 4.2.6 Inventory Control (W)
  - 4.2.7 Assistance on Machinery Maintenance (W)

5 Soenarso - Construction Specialist
- 5.1 Accomplishments

5.1.1 Planning and Supervision of Construction Program (W)
5.1.2 Monitoring of Construction at Sites (W)
5.2 Future Program
5.2.1 Planning and Supervision of Construction Program (W)
5.2.2 Monitoring of Construction at Sites (W)
5.2.3 Assistance on Project Planning for Construction (W)
6 Jerry McIntosh - Farming Systems Specialist
6.1 Accomplishments
6.1.1 Support Farming Systems Research (W)
6.1.2 Upland Agriculture and Conservation Project (W)
6.1.3 Assistance to Eastern Indonesia Ag. Dev. Project (W)
6.1.4 Reports and Seminars (W)
6.1.5 Manuscript (W)
6.2 Future Plans
6.2.1 Upland Agriculture Research (W)
6.2.2 Upland Agriculture and Conservation Project (W)
6.2.3 Master Plan of Research for MORIF (W)
6.2.4 Upland Rice Conference and Research (W)
6.2.5 Edit and Review Papers (W)
7. Diane Barrett - Post Harvest Processing Specialist
7.1 Accomplishments
7.1.1 Assistance to Research on Cassava (W)
7.1.2 Evaluation of Research on Tuber and Fruit Crops (W)
7.1.3 Five Year Research Plan on Cassava By-Products (W)
7.1.4 Cassava Reader (E)
7.1.5 Training (W)
7.2 Future Plan
7.2.1 Completion of Contract (W)
8 Igmidio Corpuz - Soil Scientist MORIF
8.1 Accomplishments
8.1.1 Research on Soil and Soil Fertility (W)
8.1.2 International Network (W)
8.1.3 Strategy on Sulfur Deficiency (W)
8.1.4 Editing Research Reports (W)
8.2 Future Program
8.2.1 Dry Land and Dry Climate Soils Research (W)
8.2.2 Field Fertilizer Experiments (W)
8.2.3 Training (W)
9 Anwar Rizvi - Plant Pathologist MORIF
9.1 Accomplishments
9.1.1 Evaluation of 5000 Lines for Tungro Virus (W)
9.1.2 Diseases of Corn, Soybeans and Potato (W)
9.1.3 Rice Field Surveys in Provinces (W)
9.1.4 Training (W)
9.2 Future Program
9.2.1 Evaluation of 5000 Lines for Tungro Virus (W)
9.2.2 Diseases of Corn, Soybeans and Potato (W)
9.2.3 Rice Field Surveys in Provinces (W)
9.2.4 Plant Disease Diagnostic Laboratory (W)
9.2.5 Rice Tungro Virus Workshop (W)
9.2.6 Training (W)
10 Fritz von Flockenstein - Agricultural Economist MORIF
10.1 Accomplishments
10.1.1 Intensive Monitoring of Farm Samples (W)

10.1.2 Use of Computers in Research (W)
10.1.3 Assistance to PATANAS (W)
10.2 Completion of His Contract (E)
11 Kevitt Brown - Rice Breeder BARIF
11.1 Accomplishments
11.1.1 Assistance in Crossing of Rice Varieties (W)
11.1.2 Assistance in Adaptation Trials (W)
11.1.3 Reports on the Program (W)
12 Bernardo Gabriel - Pest Management BARIF
12.1 Accomplishments
12.1.1 Population Dynamics of Pests in Tidal Swamps (W)
12.1.2 Preparation of Five Year Research Plan for BARIF (W)
12.1.3 Surveys of Pests and Diseases in Swampy Areas (W)
12.1.4 Rat Control Studies in Swampy Areas (W)
12.1.5 Identification and Collection of Pests in Swampy Areas (

12.2 Future Program
12.2.1 Population Dynamics in Tidal Swamps (W)
12.2.2 Surveys of Pests and Diseases in Swampy Areas (W)
12.2.3 Strategies for Multilple Cropping (W)
12.2.4 Biological Control Studies (W)
12.2.5 Chemical Control Studies (W)
12.2.6 Integrated Pest Management Studies (W)
12.2.7 Rat Control Studies in Swampy Areas (W)
13 George Manuelpillai - Soil Scientist BARIF
13.1 Accomplishments
13.1.1 Establishment of Experiments at Unit Tatas (W)
13.1.2 Establishment of Plant & Soil Laboratory at BARIF (W)
13.1.3 Studies on Acid Sulfate Soils (W)
13.1.4 Agronomic Experiments on Secondary Crops (W)
13.1.5 Preparation of Manual (W)
13.2 Future Program
13.2.1 Studies on Acid Sulfate & Peat Soils (W)
13.2.2 Agronomic Experiments on Secondary Crops (W)
13.2.3 Research on Soil and Water Management in Swampy Lands (W

14 Greta Watson - Social Scientist BARIF
14.1 Accomplishments
14.1.1 Field Surveys on Agro-Ecosystems in Swampy Lands (W)
14.1.2 Rat Control (W)
14.1.3 Reports (W)
14.2 Completion of Assignment (E)
15 Chhorn Lim - Fish Nutrition Specialist RIIF
15.1 Accomplishments
15.1.1 Economically Suitable Feeds (W)
15.1.2 Surveys of Common Carp (W)
15.1.3 Depok Sub-Station (W)
15.1.4 Collaborative Research (W)
15.1.5 Commercial Feeds (W)
15.1.6 Preparation of Research Proposals (W)
15.1.7 Publications (W)
15.2 Future Program
15.2.1 Shrimp Feed Preparation and Testing (W)
15.2.2 Research on Common Carp (W)
15.2.3 Research on Shrimp Nutrition (W)
15.2.4 Milkfish Maturation Research (W)

16 William Vanstone - Fish Breeder Gondal Station
- 16.1 Accomplishments
  - 16.1.1 Experiments on Milkfish (W)
  - 16.1.2 Spawning and Hatching of Milkfish (W)
  - 16.1.3 Establishing Research Program at New Station (W)
  - 16.1.4 Milkfish Survey (E)
- 16.2 Future Program
  - 16.2.1 Experiments on Milkfish (W)
  - 16.2.2 Spawning and Hatching of Milkfish (W)
  - 16.2.3 Studies on Shrimp Cultivation (W)

17 Hobart Peters - Reproduction Physiologist RIAP
- 17.1 Accomplishments
  - 17.1.1 Assistance to Dairy Cattle Program (W)
  - 17.1.2 Assistance to Beef Cattle & Buffalo Program (W)
  - 17.1.3 Dairy Goat Breeding and Production (W)
  - 17.1.4 Outreach Pilot Project (W)
  - 17.1.5 Training (W)
  - 17.1.6 Study of the Animal Industry (W)
- 17.2 Future Program
  - 17.2.1 Assistance to Dairy Cattle Program (W)
  - 17.2.2 Embryo Transfer Research (W)

18 Joel Levine Animal Breeder and Farming Systems Expert RIAP
- 18.1 Accomplishments
  - 18.1.1 Research on Farming Systems (W)
  - 18.1.2 Characterization of Cattle Breeds (W)
  - 18.1.3 Multi-Year Farming Systems Plan (W)
  - 18.1.4 Assistance to Breeding Staff (W)
  - 18.1.5 Publications with Staff of RIAP (W)
  - 18.1.6 Procurement (W)
- 18.2 Future Program
  - 18.2.1 Survey Research (W)
  - 18.2.2 Breeding Research (W)
  - 18.2.3 Monitoring and Evaluation of New Technologies (W)
  - 18.2.4 Data Processing and Analysis (W)

19 Ruth Gatenby - Environmental Physiologist RIAP
- 19.1 Accomplishments
  - 19.1.1 Surveys on Sheep and Goats (W)
  - 19.1.2 Outreach Pilot Project (W)
  - 19.1.3 Creation of Environmental Physiology Program (W)
  - 19.1.4 Film on Small Ruminants (W)
  - 19.1.5 Data Analysis (W)
  - 19.1.6 Publications (W)
- 19.2 Future Program
  - 19.2.1 Assistance to Lili Station (W)
  - 19.2.2 Surveys on Sheep and Goats (W)
  - 19.2.3 Outreach Pilot Project (W)
  - 19.2.4 Data Analysis and Publications (E)

20 Forest Silviculturist - Samarinda Forestry Institute (E)

21 Forest Soil Scientist (E)

22 Agricultural Economist - MORIF (E)

B. DETAILED DESCRIPTION OF ACCOMPLISHMENTS FROM BEGINNING OF ASSIGNMENT TO DECEMBER 31, 1985 AND FUTURE PROGRAMS OF EACH EXPERT

1 William L. Collier - Chief of Party

1.1 Accomplishments

1.1.1 Assistance to the Team Leader (W)

The main accomplishment has been the daily assistance to the Team Leader of the AARP. It ranges helping with the planning and management of the project to writing letters in English. It is the most important aspect of the job, helping to make sure the project is carried out as smoothly as possible.

1.1.2 Assistance to the Secretariate

1.1.2.1 Development of Swamps II (W)

Since he spent five years conducting research on farming systems in tidal swamp lands of Sumatra and Kalimantan. He was asked to help in the formulation of the agricultural research component of the GOI-World Bank - Second Swamp Recamation Project (Swamps II). He was involved in the formulation of the research program, helped with the visits of the World Bank team, and assisted in the AARD's meetings to launch the project.

1.1.2.2 Development of Upland Agriculture (W)

He assisted in the original formulation of this project proposal. Discussions with researchers were held and the proposal developed by the Secretariate.

1.1.2.3 Development of Eastern Indonesia (W)

He assisted in the formulation of the project proposal which initiated the discussions on this project.

1.1.2.4 Assistance on Speech Writing and Papers (W)

In order to assist the the Secretariate, he has assisted when asked with the editing and preparation of a number of speeches and papers for various officials in AARD and in the Minsitry of Agriculture. He has also helped with the organizing of international meetings sponsored by the AARD.

1.1.2.5 Kepas (W)

Dr. Collier assisted Dr. Ibrahim Manwan in the establishment of the Agro-Ecosystem Working Group (Kepas) in cooperation with the Ford Foundation. He is the secretary of the group and was very active in its Farming Systems in Tidal Swamps Group which

had a major seminar on this topic in Banjarmasin. The results of this seminar were extensively used by the GOI and the World Bank in the designing the agricultural research component in the Bank supported Second Swamp Reclamation Project.

1.1.2.6 Project Management (W)

He is in the process of assisting with a project management and monitoring system using micro-computers for the Secretariate. Information is being gathered on the various systems and once the computers arrive a system will be set up that collects information from the projects and makes it available at the secretariate. The AARP has already set up a system of reporting on construction from each site which is entered into a computer and reports will be generated each month.

1.1.3 Assistance to the Director General (W)

Dr. Collier has provided some assistance to the Director General in editing his speeches and papers.

1.1.4 Management of AARP/RMI Experts (W)

One of his main jobs is the management of the experts in the technical assistance portion of the AARP. This requires trips to the locations and assisting the experts to make as much of a contribution as possible at the research institutes.

1.1.5 Computer Purchase (W)

He has spent the last 18 months assisting in the purchase of eight micro computers for the Secretariate and four research institutes. He developed the specifications for the purchase, assisted in arranging for the permissions, helped in meeting the various requirements necessary from USAID and the GOI, and now is assisting in the tender for the purchase.

1.1.6 Assistance to Procurement and PSA (W)

He is helping the project in making the rather complicated arrangements for the purchase of the field and laboratory equipment. He was involved in the approval process of the Procurement Services Agent and is now assisting the preparations for the first tender. He will be working with the tender document to assure it satisfies the regulations of both USAID and the GOI.

1.1.7 Detailed plan and PACD Extension (W)

The activity which has taken the most time is the development of the detailed plan for the extension of the AARP. He has put most of the information on the computer to be able to respond to the various changes that occur on a regular basis. The plan covers all aspects of the AARP.

1.2 Future Program

1.2.1 Project Management, Monitoring and Evaluation (W)

In order to assist the Agency he will assist in the development of a system for management, monitoring and evaluation of projects. This is made possible by the purchase of micro computers for the secretariate which will have two quite powerful computer systems.

He will also help in the development of a systems of evaluating the experts.

1.2.2 Micro Computer Training Program (W)

In order to provide assistance to the staff of AARD in the use of the micro-computers, Dr. Collier is organizing a micro computer training course for administrators, researchers and secretaries. He will also teach several of the components of the course on how to use various types of computer software.

1.2.3 Computer Use at Research Institutes and Secretariate (W)

Once the course on computers is completed, he will monitor the use of these computers at the institutes and the secretariate and assist all of them in the efficient use of these machines for research and administration.

1.2.4 Assistance to Swamps II (W)

Since he has been involved with the development of this project from the beginning, he will continue to help the Secretariate to carryout this project. He is presently helping the Team Leader in planning of the program.

1.2.5 Management of Technical Assistance (W)

Since his main job is managing the technical assistance, he will continue to help the experts in their roles at the research institutes. Some of this effort will go into the in-country training courses which the experts will assist.

2 Carl R. Fritz - Training Officer

2.1 Accomplishments

2.1.1 Administrative Specialist (W)

During the first two years of this assignment with the AARP, Mr. Fritz was the administrative specialist who was responsible for the management and reporting for the project. He also became very deeply involved in the short term training program. His main accomplishment was the establishment of the accounting procedures and administrative procedures for managing of the technical assistance. A substantial amount of his time was devoted to assisting the project in understanding various USAID requirements for managing and reporting on a major assistance project. He was very active in helping the Team Leader and his assistants on reporting to USAID on the project.

2.1.2 Managing Short Term Training Abroad (W)

To assist the AARP, Mr. Fritz took over the administration of the short term technical assistance for the AARP. He spent a substantial amount of time in arranging for the proper training programs for the staff of AARD. Since April 1984, he has become the Training Officer for the project, and thus has devoted most of his time to the short term training. He has arranged and also carried out himself the English language testing at many institutes in Java, Kalimantan and Sulawesi. He has interviewed each prospective candidate to determine their training needs, then discussed the possibilites with the Institute directors to try to match the needs of the prospective trainee, the needs of the Institute with the availability of training programs abroad. He has been the most successful in finding or making special arrangements for the best courses to suit the needs of the scientists and the institute.

He has developed proposals for in-country English language training and embryo transfer training. He has been able to get approval from USAID for the language training.

2.2 Future Program

2.2.1 Managing Short Term Training Abroad (W)

Mr. Fritz will continue devoting most of his time to managing the short term training program. He will continue making effort to match the needs of the AARD with the available programs abroad. This requires a large amount of correspondence with the organizations in the U.S. and Asia that provide training. He will be discussing the training needs and programs with the institute directors and the heads of the centers in order to assure that the programs fit the needs of the AARD and the capabilities of the prospective trainees.

2.2.2 Managing In-Country Training Workshops (W)

As part of the extension of the AARP a number of new activities will be added to the program. One of the main activitiew will be in-country training workshops. At the present this appears to include the micro-computer training workshop, the English language training program, institute farm development, and the rice tungro virus workshop. It will be Mr. Fritz's responsibility to organize these programs in cooperation with the AARP/RMI experts.

2.2.3 Managing English Language Program (W)

Since the most serious problem confronting training abroad is the level of English compentency of the AARD staff, Mr.Fritz will concentrate a reasonable amount of his time on managing this program and assuring it is a success. The program will be for a two-year period and thus will take a large input of time from him.

3 Moestadjab - Administrative Specialist

3.1 Accomplishments

3.1.1 Administration of Project (W)

In May 1984 Mr. Moestadjab took over the administrative specialist position from Mr. Fritz as was stated in the contract between RMI and the GOI. His major accomplishment in this short period is to help reconcile the accounting systems of the GOI and the U.S. He has been especially helpful in arranging for prompt transfer of funds for the project. He is responsible for the monthly financial report to the Director General for the project.

3.1.2 Assistance to Team Leader (W)

Since he was employed with several large assistance projects before joining the AARP, he has assisted the Team Leader Ir. Sudasrip in managing the financial reporting requirements of USAID.

3.1.3 Assistance to Financial Officer of AARP (W)

Since the financial officer of the project does not have past experience with large USAID projects, Mr. Moestadjab has been active in giving him assistance in carrying out this responsibility.

3.2 Future Program

3.2.1 Administration of the Project (W)

He will continue to be deeply involved in the administration of the AARP/RMI assistance to the AARD. He will take on more duties on financial reporting as he learns the intricaces of the reporting. His main responsibility is this activity.

3.2.2 Assistance to the Team Leader (W)

An important aspect of his responsibilities is to respond to the needs of the Team Leader when there are tasks that he can handle. He is responsible for assisting the Team Leader in assisting on administrative problems.

3.2.3 Assistance to the Financial Officer of AARP (W)

Mr. Moestadjab will continue to work with the financial officer of the project in primairly reporting on the monthly expenditures to the Director General and to USAID.

4 Roland Harwood - Farm Development Specialist

4.1 Accomplishments

4.1.1 Monitoring of Construction (W)

Immediately upon his arrival, Mr. Harwood was involved in the monitoring of the construction of the auditorium. He made a major contribution by quickly identifying several problems and having the contractor to make certain adjustments. Since this occurred, he has been very active in monitoring the construction at each of the sites. It requires someone with experience in construction to be able to identify the problems and suggest corrections before it is too late to correct the problem. His major contribution has been to assist the institute directors who are trained researchers to be aware of construction problems in time to be corrected.

4.1.2 Assistance to Station Design (W)

To speed up the design process, Mr. Harwood has been especially active in meeting with the designers, the users and USAID in preparing the designs of the buildings and the layouts of the Institutes. Since he has been involved in station management for thirty years, he has been able to review these designs and make suggestions that will make the running of the stations more pleasant and efficient.

He has visited all of the sites for the design layouts and provided valuable suggestions especially when there were difficulties not readily apparent to an inexperienced person in

station design. This has been a major contribution, as shown in the design of the screen houses and the deemphasis of the use of green houses.

4.1.3 Preparation of Procurement Lists (W)

One of his initial assignments was the preparation of the specifications for the procurement of field and lab equipment. He has prepared the first list with all of the required specifications and the second list has almost been completed. He has met frequently with both the directors who have requested the equipment and the Procurement Services Agent who will arrange for the purchase based on the specifications.

4.1.4 Creating an Awareness of Station Management (W)

He personally feels that his major contribution has been to create an awareness of the importance of station and farm management for the institutes. He has met with the Director General, has prepared several papers and had frequent discussions with the directors on the importance of farm management. Resulting from these efforts is the in-country training program on farm development and management.

4.2 Future Program

4.2.1 Monitoring of Construction (W)

Obviously, he will devote a substantial amount of his future time to monitoring of the construction at each site. Fortunately, we now have a construction expert to help Mr. Harwood perform this important role. He will visit the sites and monitor the progress.

4.2.2 Assistance to Station Design (W)

He will continue to advise and monitor the design of the buildings and the preparation of the station layouts. This means he will meet very frequently with the designers, the users and USAID to help meet all of their needs and fulfill their requlations.

4.2.3 Preparation of Procurment Lists 2 and 3 (W)

He will finish the specifications for the second procurement list. This will require meetings with the institutes requesting the equipment in order to determine exactly what their needs are and then assist them in choosing the appropriate equipment. Once this is done he has to develop the specific specifications which

are understandable for the PSA and the suppliers. He will then when this list is completed work on the third and final list. It will be especially important to make sure all the necessary equipment is included since this will be the last order.

4.2.4 Design and Preparation of Station Farms (W)

In his terms of reference one of his main responsibilities was to be farm development and design. So far he has not been able to concentrate on this job because of the need to get the construction and procurement underway. Now that these two are moving along smoothly, Mr. Harwood will spend much more time on designing the experimental farms for the institutes. The AARP is designed so that the farm development comes during the final two years of the project due to funding and construction reasons.

4.2.5 Pilot Project and Short Term Training on Farm Development (W)

He has prepared and gotten approval for a short term training program and pilot project on station development. This will be carried out at the new Banjarbaru institute and will develop 10 ha of land for experiments and then use this for the training program. He will be responsible for this program, provide most of the expertise and do most of the teaching. He will be assisted by other experts.

4.2.6 Inventory Control (W)

Both Mr. Harwood and Dr.Collier will assist the project in developing a system for inventory control to make it easier to monitor and control the use of the field and lab equipment provided by the project. He will assist in systems at the institute and farm level and Dr. Collier will assist at the secretariate level using micro computers for inventory control. A system will be suggested that uses a card file system at the farm level, transfers the information to the computer at the institute and then a summary of the inventory control will be sent monthly to the secretariate.

4.2.7 Assistance on Machinery Maintenance (W)

Since he has much experience with maintenance of machinery for agricultural experiment stations, he has been helping the farm shops when ever possible with suggestions on maintenance. He would like to formalize this role by giving more assistance in a way that more of the shops could benefit. He will make a proposal on training in machinery maintenane and shop management. He will continue to help the shops when he visits the institutes.

5 Soenarso - Construction Specialist

5.1 Accomplishments

5.1.1 Planning and Supervision of Construction Program (W)

Although he has only been with the AARP/RMI for several months, has already made a major contribution in assisting the Team Leader in speeding up the processing of documents and getting the necessary approvals for the construction at each site. He has been instrumental in developing a reporting system that is being computerized and will receive reports each month from the sites and then rapidly preparing summary reports on the financial and physical progress.

5.1.2 Monitoring of Construction at Sites (W)

He has quickly begun to assist Mr. Harwood in the monitoring of the construction at each site. He also has been assisting the estimating of the physical progress by observation and then using S curves to show what was planned and what was achieved. For each site there is now a monthly record of the percentage progress and this is used in the reporting on the actual progress and the planned progress.

5.2 Future Program

5.2.1 Planning and Supervision of Construction Program (W)

He will take over as much as possible from Mr. Harwood, the planning and supervision of the construction program in order that Mr. Harwood can shift his activities to farm development. Mr. Soenarso will be deeply involved in developing the documents and getting approvals for the construction, both from the GOI and the USAID. He will continue visiting all of the sites under construction and will maintain the reporting system with the data being transfered to the computer for rapid monthly reporting.

5.2.2 Monitoring of Construction at Sites (W)

He will continue his role of monitoring the construction at each site and reporting if there are any problems. He will be asssting the Directors of the institutes in monitoring this construction.

5.2.3 Assistance on Project Planning for Construction (W)

As he begins to feel that the construction program is under control and in the final phases of completion, he will provide assistance to the secretariate in procedures and methods for planning of construction. This will also include procedures for permission and monitoring as specified by the GOI.

6 Jerry McIntosh - Farming Systems Specialist

6.1 Accomplishments

6.1.1 Support Farming Systems Research (W)

His main achievement is the creation of a strong group of scientists involved in farming systems research in the AARD. He has been performing this role for many years. As one of the AARP/RMI/IRRI experts, he has continued this role during the two years he has been working with the AARP. This achievement is very clear when one looks at the research program and the staff trained in farming systems research at AARD.

6.1.2 Upland Agriculture and Conservation Project (W)

One of his main achievements during the last two years is the support he has given to the Upland Agriculture and Conservation Project. He has been involved from the beginning in assisting in the formulation of the project, being involved in the research leading up to this project, being one of the experts asked by USAID to prepare the proposal for the project, and now being involved in the research already initiated within this project.

6.1.3 Assistance to Eastern Indonesia Ag. Dev. Project (W)

He assisted in the formulation of this project which will be funded by the GOI and the World Bank.

6.1.4 Reports and Seminars (W)

He has prepared many reports with his Indonesian counterparts for seminars and publications both within Indonesia and abroad. He has trained many Indonesian staff in report writing and data analysis. Besides this, he has been very active presenting research results with his colleagues at many international meetings, especially those sponsored by IRRI.

As part of this activity, he is preparing and editing the papers for the Upland Rice Conference to be held in March, 1985.

6.1.5 Manuscript (W)

He is in the final phase of reworking the manuscript for publication on Farming Systems Research and Development.

6.2 Future Plans

6.2.1 Upland Agriculture Research (W)

He is assisting in the planning to develop a transect of research sites in Sumatra, Kalimantan, Sulawesi and Java on red yellow polzolic soils. This is a collaborative effort between the Soils and Food Crops Research Centers. The work covers research on fertilizer efficiency in cropping systems, pXlime, pXvarieties and varietal selection studies.

In addition he will assist in developing upland mixed farming systems research, such as, incorporated in the crop/livestock.

6.2.2 Upland Agriculture and Conservation Project (W)

He will help develop the detailed plan of work for this project. Dr McIntosh will be a key person in the implementation of the research in this project.

6.2.3 Master Plan of Research for MORIF (W)

In order to develop a master plan for research at the Maros Research Institute for Food Crops that will help them fulfill their research mandate, he has been asked to join a team of experts for this purpose. The Institute has the mandate to do agricultural research for dryland and dry climate regions of Indonesia. The team will help them to formulate a relevant research plan.

6.2.4 Upland Rice Conference and Research (W)

The planning for the Upland Rice Monitoring Tour and Conference to be held in Indonesia the last week of February and the first week of March is progressing. Some of the plots for research is located in Lampung, South Sumatra and West Sumatra will be part of the monitoring tour.

6.2.5 Edit and Review Papers (W)

He will continue his role of editing and reviewing papers of the AARD staff for conferences.

7 Diane Barrett - Post Harvest Processing Specialist

7.1 Accomplishments

7.1.1 Assistance to Research on Cassava (W)

She has been assisting the following research projects.

1. Fresh cassava storage study
2. Cassavastorage pre-trial conducted with 10 different varieties, stored in the open air for 10 days to observe r rates of deterioration.
3. Sweet potato leaf analysis experiment.
4. Collection of both local and Australian pigeon pea varieties for physico-chemical analysis.
5. Initiation of physico-chemical analysis of available pigeon peas.
6. Rat feeding studies. The studies will analyze protein efficiency and biological value following feeding diets of instant rice and pigeon peas.
7. Comparison of three different methods of starch analysis for sweet potatoes.

7.1.2 Evaluation of Research on Tuber and Fruit Crops (W)

In cooperation with Dr. Gunawan Satari and Dr. Soewarno Soekarto, she has participated in the Postharvest Evaluation of Tuber and Fruit Crops for AARD.

7.1.3 Five Year Research Plan on Cassava By-Products (W)

She has assisted in the development of a five year research plan on cassava by product utilization. This research will be primarily carried out at the Sukamandi Research Institute for Food Crops.

7.1.4 Cassava Reader (E)

7.1.5 Training (W)

She has been very active in training the staff in post harvest research methods. As an example she recently gave training in the following:

1. Theory of starch gelatinization and changes in viscosity.
2. Comparison of three different methods of moisture analysis.
3. Comparison of two different methods of crude fiber analysis and accuracy of results.

7.2 Future Plan

7.2.1 Completion of Contract (W)

She will finish her contract in April and return to the US. She is presently finishing up her research activities and completing the research reports in collaboration with her counterparts.

8 Igmidio Corpuz - Soil Scientist MORIF

8.1 Accomplishments

8.1.1 Research on Soil and Soil Fertility (W)

He has had many research reports with his colleagues in the department. These are too many to report on in this review, yet his greatest achievement is the many reports, both published and unpublished, that he and the staff have produced during the last few years.

Recently, he redesigned the long term organic and inorganic experiment that is being conducte at the Lanrang sub-station.

He helped design and is assisting in the implementation of experiments on (1) response to hybrid rice to nitrogen application, (2) use of lime in swampy areas converted into rice fields, (3) the effect of the continuous application of phosphorus on lowland rice, (4) the effect of the continuous application of sulfur on lowland rice, (5) pot experiment to find out the the cause of the yellowing of the rice plants.

He was actively involved in the data gathering from field fertilizer experiments for (1) response of hybrid rice to nitrogen application at Maros, (2) use of azolla on Lowland rice at Maros, (3) comparing methods of fertilizer application : machine vs hand at Maros, (4) long term effect of continuous application of sulfur at Maros, and (5) long term soil fertility trial at Maros.

8.1.2 International Network (W)

He assisted in the implementation of the trials for the International Network on Soil Fertility and Fertilizer for Rice Program (INSFER).

8.1.3 Strategy on Sulfur Deficiency (W)

He helped rewrite the "Strategy in Solving and Preventing Sulfur Deficiency Problems in Wetland Rice Areas" which is co-authored by Christine Momuat and I. T. Corpuz for publication in the Indonesian Agricultural Research and Development Journal.

8.1.4 Editing Research Reports (W)

He assisted a number of staff members by editing their research reports for publication. Each month he does several of these jobs.

8.2 Future Program

8.2.1 Dry Land and Dry Climate Soils Research (W)

Since the mandate of the Institute has changed to dry land and dry climate regions in Indonesia, he will respond to this by designing and assisting research on soils and fertility in these regions.

8.2.2 Field Fertilizer Experiments (W)

He will continue to participate in implementing the field fertilizer experiments. He will design trials to test the urea applicators with the tenant-farmers at Maros and at the Lanrang Experimental Farm as cooperators.

8.2.3 Training (W)

Dr. Corpuz will continue to provide assistance to the other research staff at the Institute. He helps in the formulation, implementation and the report writing. This may be his most important contribution to the Institute.

9 Anwar Rizvi - Plant Pathologist MORIF

9.1 Accomplishments

9.1.1 Evaluation of 5000 Lines for Tungro Virus (W)

As a major part of his assignment he initiated in 1983 evaluation of trials of breeding lines resistant to tungro virus. He will spend at least three years on this work. They have at present three Rice Tungro Virus (RTV) experiments at Lanrang. These are (1) RTV nursery evaluation of 1425 breeding lines and 53 varieties, (2) use of an insecticide to control RTV using 8 rice varieties, and (3) incidence of tungro in relation to 4 planting dates using 8 varieties of rice.

In addition he is assisting the staff in evaluating the gene rotation theory for tungro in the greenhouses.

9.1.2 Diseases of Corn, Soybeans and Potato (W)

He is helping to establish a plant disease diagnostic lab and teaching the staff how to perform the necessary work.

He provided training and assistance to isolate, culture and identify the fungal pathogen causing the damping-off disease in soybean seedlings.

Dr. Rizvi continued the isolation, culturing and identification of pathogens causing diseases in food crops.

To do this research, he continues to assist his counterparts in setting up their field, greenhouse and laboratory experiments, collecting of data, writing and editing of research results.

9.1.3 Rice Field Surveys in Provinces (W)

Dr. Rizvi has been asked a number of times to visit various regions in South Sulawesi and in provinces in Java and Eastern Indonesia, and in Irian Jaya to assist in identification of plant diseases. He has made a major contribution to the Institute by providing this service to the Government.

9.1.4 Training (W)

He has been very active in giving seminars at the Institute and providing special training programs to the staff. Besides this, he is assiting the staff in the reviewing and editing of their papers for seminars and publication.

9.2 Future Program

9.2.1 Evaluation of 5000 Lines for Tungro Virus (W)

Since this is a three year program, he will continue this evaluation of rice tungro virus resistance. Since they have done less than one-half of the 5000 lines, thus they will greatly increase the number evaluated in the next two years.

9.2.2 Diseases of Corn, Soybeans and Potato (W)

He will continue his work on isolating, culturing and identifying pathogens causing diseases in food crops. A major part of this activity is training the staff to do this work. This is part of the effort to establish the plant disease dignostic laboratory at the Institute.

He will assist the staff in setting up their field, greenhouse and laboratory experiments, collection of data, writing and editing of research results.

9.2.3 Rice Field Surveys in Provinces (W)

He will continue to provide assitance to the extension agency by assisting in the identification of plant diseases wherever the Director sends him. This includes the monitoring and surveying of

the incidence of the diseases and to recommend their control measures. He will also provide the necessary background information to educate farmers and Agricultural Extension staff involved.

9.2.4 Plant Disease Diagnostic Laboratory (W)

As mentioned he will continue to train the staff to develop this lab. He will assist in developing new and adapting available laboratory procedures for the identification, isolation and detection of pathogene causing diseases in food crops.

9.2.5 Rice Tungro Virus Workshop (W)

Since the In-Counry Training Program on Rice Tungro Virus has been approved, he will be deeply involved in the organizing and teaching for the program. He will be the AARP/RMI expert assigned to carry out this program.

9.2.6 Training (W)

Dr. Rizvi will assist the staff members of the Plant Pathology Department in designing, executing and data collection of their research experiments. He will provide the necessary training in Phytopathological techniques used in the laboratory, green or screenhouses and field to improve results of research experiments. Assist and encourage the Pathology staff members to write up their research findings for the publication refereed journals both ot national and international standing.

10 Fritz von Fleckenstein - Agricultural Economist MORIF

10.1 Accomplishments

10.1.1 Intensive Monitoring of Farm Samples (W)

His major contribution was the initiation of an intensive monitoring of a small sample of rice farmers near the Maros Food Crops Research Institute. The purpose was to identify crop production problems, monitor the impact of the high yielding varieties and other new technologies, and to identify social and economic constraints to production. A methodology has been developed to analyze this data with a micro computer and to report the results. He provided training in this methodology to the staff of the Agricultural Economics Department.

10.1.2 Use of Computers in Research (W)

Dr Fleckenstein has been instrumental in introducing the use of micro computers to the staff, especially in his department. He has provided some training and showed to the staff what can be accomplished with these micro computers.

10.1.3 Assistance to PATANAS (W)

Since South Sulawesi is part of the PATANAS program, he has helped in the design and implementation of this very large social and economic data gathering and reporting project.

10.2 Completion of His Contract (E)

11 Kevitt Brown - Rice Breeder BARIF

11.1 Accomplishments

11.1.1 Assistance in Crossing of Rice Varieties (W)

Dr. Brown's main contribution has assisted the swamp rice breeding program. BARIF has just begun to generate new germplasm through hybridization. In one of his reports he lists the BARIF crosses to date together with the breeding objectives. All of the crosses have been made in the tidal swamp program. Prior to this time, pure lines and varieties derived from external sources have predominated. Out of 952 lines introduced in 1983/84, 67% have come from Bogor, 32% from IRRI and 1% from other sources. Traditional rice varieties have been used in crosses for local adaptation, particularly to acid soil conditions. BARIF serves to collect and characterize thes Indonesian swamp rice varieties.

To date, two varieties, Mahakam and Kapuas, have been released from the BAFIF tidal swamp program. Both are progenies of crosses made in Bogor.

11.1.2 Assistance in Adaptation Trials (W)

He has assisted the department at their 7 experimental stations, four of which are located in the tidal swamps and three in deepwater swamp areas. In addition, breeding materials are tested at several other locations of farmer's fields.

11.1.3 Reports on the Program (W)

As final reports at the end of his assignment, Dr Brown and Ir S. Sulaiman prepared three reports which have been submitted for publication. These are:

1. Evaluation of Upland Rice Testing Sites in Kalimantan.
2. Present ano Future Challenges of the BARIF Indonesian swamp rice breeding program - I. Tidal swamps.

3. Present and Future Challenges of the BARIF Indonesian Swamp Rice Breeding Program - II. Deepwater Swamps.

12 Bernardo Gabriel - Pest Management BARIF

12.1 Accomplishments

12.1.1 Population Dynamics of Pests in Tidal Swamps (W)

He and the other members of the staff have made many field trips to their research sites in the swampy areas. They established pest monitoring and surveilence activities for the different BARIF sub-stations. This included insects, rats, diseases and weeds. They submitted for publication "An Inventory of the Weeds in Tidal Swamps in Indonesia".

12.1.2 Preparation of Five Year Research Plan for BARIF (W)

Dr. Gabriel has helped the Institute's Director to prepare a five year plan for research of BARIF. They had many meetings with the staff in developing the plan.

12.1.3 Surveys of Pests and Diseases in Swampy Areas (W)

As mentioned above he and the members of the Department have made many surveys of the pests and diseases in the swampsy areas. This is partly to train the staff and also to gather information since very little is known on this topic.

12.1.4 Rat Control Studies in Swampy Areas (W)

Dr. Gabriel and volunteer Mr. Tom Gula has conducted studies of various methods of rat control. They have developed a collection of specimens for identification.

12.1.5 Identification and Collection of Pests in Swampy Areas (W)

As part of these surveys they have developed a major collection of pests that occur in the swampy lands of Kalimantan. This is the only collection of Pests in Kalimantan.

12.2 Future Program

12.2.1 Population Dynamics in Tidal Swamps (W)

Dr. Gabriel and the staff will continue their work on population dynamics and produce several reports for publication. This work is to develop effective control measures for use by the farmers.

12.2.2 Surveys of Pests and Diseases in Swampy Areas (W)

Since this work has only begun during the first year of his assignment, it will require many surveys to develop the necessary information on pest and diseases for use by the staff, the extension service and the farmers.

12.2.3 Strategies for Multilple Cropping (W)

Based on their findings on pests and disease, they will develop strategies for control based on various combinations of crops.

12.2.4 Biological Control Studies (W)

He will help the staff initiate research on biological control of pests in the swampy lands.

12.2.5 Chemical Control Studies (W)

Dr Gabriel will assist the Institute in studies on chemical control of pests.

12.2.6 Integrated Pest Management Studies (W)

One of the most important new programs related to the above research, will be the research on integrated pest management in the swampy lands. He will work with the staff in developing these studies.

12.2.7 Rat Control Studies in Swampy Areas (W)

They will continue to collect specimens and information on their habits. Some work has been done on the effectiveness of control measures, this will be expanded.

13 George Manuelpillai - Soil Scientist BARIF

13.1 Accomplishments

13.1.1 Establishment of Experiments at Unit Tatas (W)

His main achievement during the months he has been at BARIF has been to encourage the initiation of research activities at the new experimental farm at Unit Tatas which is in the swampy lands and near major transmigration sites. They have developed a model experimental site at Unit Tatas. As part of this activity, they have developed a polder for water management studies.

13.1.2 Establishment of Plant & Soil Laboratory at BARIF (W)

He has assisted in the establishment of a plant and soil laboratory at BARIF. It is capable of analysing soil, plant and water samples with a high degree of accuracy using USDA and internationally accepted methods.

13.1.3 Studies on Acid Sulfate Soils (W)

They have initiated studies on acid sulfate soils which are prevalent throughout these swampy areas, and are confronting the transmigrants with problems not found on Java.

13.1.4 Agronomic Experiments on Secondary Crops (W)

He and the other staff members have installed agronomic experiments in the dry season 1984 on responses to N, P and lime effects identified for maize, soybeans, cowpea, and Mung bean. Also, they examined the response to inoculation with native rhizobia which was collected locally.

13.1.5 Preparation of Manual (W)

He has prepared a manual on "Procedures, Guidelines and Data Collection for Rice Based Experiments at BARIF" which is being circulated for comments.

13.2 Future Program

13.2.1 Studies on Acid Sulfate & Peat Soils (W)

During the next year they will initiate studies on (1) short and long term studies on soil-plant- water systems, (2) high intensity soil mapping, (3) amelioration of acid sulfate soils by the addition of small amounts of lime, (4) the effect of inorganic fertilizer N, P and lime in crop responses, (5) examination of the redox (oxidation/reduction) processes, and (6) to study infiltration rate (hydraulic conductivity, permeability, porisity) measured under field conditions.

13.2.2 Agronomic Experiments on Secondary Crops (W)

They will continue these experiments during each dry season.

13.2.3 Research on Soil and Water Management in Swampy Lands (W)

At the Unit Tatas site they will plan, design and study water management in a polder system which will be applicable for the transmigrants in the nearby locations.

14 Greta Watson - Social Scientist BARIF

14.1 Accomplishments

14.1.1 Field Surveys on Agro-Ecosystems in Swampy Lands (W)

She has carried out a number of field surveys with the staff in order to examine and understand the various agro-ecosystems in these swampy lands. It is also for training of the staff in research methods. They have prepared reports on their findings whcih are being published.

With the agro-economics staff, they prepared project proposals for 16 proposed units of research which will be the basis for selecting 5 to 7 units for implementation in 1985/86.

She helped in the preparation of a proposal for agroecosystems research in lebak (fresh water swamps) areas of South Kalimantan.

14.1.2 Rat Control (W)

She is involved in research on the transfer of technology for effective rat control.

14.1.3 Reports (W)

She is assisting the Department in the preparation of two agroeconomics papers for publication which are (1) Lebak Farming Systems in South Kalimantan, and (2) Imporvement of Agricultural Technologies for Swampy Lands: An Agroeconomic Perspective.

14.2 Completion of Assignment (E)

15 Chhorn Lim - Fish Nutrition Specialist RIIF

15.1 Accomplishments

15.1.1 Economically Suitable Feeds (W)

Dr. Lim has helped the Department by teaching the staff the importance of the formulation of experimental diets, information and criteria needed in feed formulationand the various steps in feed processing. They have obtained the necessary equipment, developed proper experimental designs and data collection and recording initiated. The vitamin mix and mineral mix formulae for varius species cultured under various systems have been developed and used successfully.

15.1.2 Surveys of Common Carp (W)

Surveys to various running water common carp farms in Java were conducted to determine the status and problems related to feed and feeding. Various feed manufactures were also visited to evaluate the status of the existing technology in fish feeds and their related problems. This information has been used as a guide in formulating long-term and short term research programs.

15.1.3 Depok Sub-Station (W)

The major problems faced by the researchers at this station were poor growth and survival of the larvae cultured under laboratory conditions. A simple water recirculating system for larval rearing of giant gouramy was introduced. The feeding rate and feeding frequency increased. A great improvement in the growth and survival was achieved.

15.1.4 Collaborative Research (W)

Several experiments were conducted in collaboration with the Institute staff. These were:
1. Effect of feeding regimes on gonadal development of milkfish (completed).
2. Milkfish maturation using different size and shapes of tanks (completed).
3. Palatability of various diets for bull frogs (completed)
4. Effect of dietary levels of lipid on the maturation, fecundity and egg hatching rate of common carp (completed)
5. Growth and survival of giant gouramy larvae fed various combinations of an artificial diet and Moina sp. (completed)
6. Effect of feeding rates on the growth and survival of giant gouramy larvae (completed)
7. Effect of feeding rates on the production of common carp in running water ponds (completed).
8. Evaluation of commercial feeds for common carp cultured in running water ponds (on-going).
9. Determination of optimum carbohydrate to lipid ratio for common carp diets (on-going).
10. Effect of feeding methods on the production of common carp in running water ponds (on-going).

15.1.5 Commercial Feeds (W)

A few commercial feeds were available for the common carp cultured in running water ponds. The quality was poor and the feed conversion low. These feeds were examined and a significantly better feed formula has been developed.

A feed formulae for the matruation of milkfish has also been developed and evaluated.

The artificial diets for different stages of Penaeus mondon (shrimp) were formulated. These are being used and/or evaluated at one of the sub stations.

Due to the recent spawning and hatching of milkfish at the Gondol Station, he formulated and prepared an artificial diet for milkfish fry. This will be useful for pond operators and for the station in rearing the fry.

15.1.6 Preparation of Research Proposals (W)

He assisted the institute recently in preparing six research proposals; three on milkfish matruation and broodstock at Gondol and the other three on shrimp nurseries.

15.1.7 Publications (W)

Two publications have been prepared which are (1) Recommendations on the Quality Control of Fish Feed, and (2) Problems in Shrimp Feed and Feeding. Several more publications resulting from the various experiments are in the process of being prepared. These are in collaboration with the staff of the Institute.

15.2 Future Program

15.2.1 Shrimp Feed Preparation and Testing (W)

Studies on P. monodon will be concentrated on feed formulation and testing against commercial feeds. Feeding practices will also be developed.

15.2.2 Research on Common Carp (W)

Research will concentrate on improvement of the existing feed formulae. Substitution of the imported feed materials with locally available feedstuffs will be conducted to reduce the feed cost. A manual on common carp nutrition, feeds and feeding will be prepared.

15.2.3 Research on Shrimp Nutrition (W)

The commerically acceptable diets for intensive culture of P. Mondon will be developed. Suitable feeds for early larval stage will be developed. The research data will be written and published with his collaborators.

15.2.4 Milkfish Maturation Research (W)

Experiments on milkfish maturation will be continued at the Gondol Station. Larval feeds will be developed and tested.

16 William Vanstone - Fish Breeder Gondal Station

16.1 Accomplishments

16.1.1 Experiments on Milkfish (W)

Dr. Vanstone has assisted two experiments on milkfish maturation at Japara which are (1) Effect of feeding regimes on the maturation of milkfish and (2) Maturation of milkfish using different sizes and shape of tanks. He has procured juveniles milkfish and maintains them in tank and cages for broodstock development.

16.1.2 Spawning and Hatching of Milkfish (W)

For the first time, Dr. Vanstone and the staff at Gondol have spawned and hatched milkfish in canvas tanks without harmonal injections. They have achieved this three times and it is the first time any researchers have been able to do this. The station is small and just being developed, yet they have accomplished more than the multi-million dollar stations in the Philippines or the work being conducted in Hawaii or Taiwan.

16.1.3 Establishing Research Program at New Station (W)

He supervised and assisted in the installation and construction of six 6 meter diameter canvas tanks, a raft and two floating net cages, life support systems (air and water supply) and other temporary facilities needed for holding of broodstock and research. He supervised the construction of his house and did the landscaping. He assisted in the procurement of generators and some research equipment.

16.1.4 Milkfish Survey (E)

16.2 Future Program

16.2.1 Experiments on Milkfish (W)

He will assist in the conduct of various experiments in milkfish maturation. The fish with mature ovaries will be spawned using different techniques. Larval rearing will be done. The method of spawning will be standarized and larval rearing developed.

16.2.2 Spawning and Hatching of Milkfish (W)

As mentioned above, the spawning and hatching that has already occured will be studied and systems developed to make this possible on a commercial scale.

16.2.3 Studies on Shrimp Cultivation (W)

Studies on shrimp cultivation and nutrition will be continued in collaboration with the staff.

17 Hobart Peters - Reproduction Physiologist RIAP

17.1 Accomplishments

17.1.1 Assistance to Dairy Cattle Program (W)

He assisted in developing the plans for a dairy cattle breeding program for Indonesia which were presented in a seminar and meetings with staff. This has culminated in the submission of a project outline under the title, "Improving Quality and Productivity of Dairy Cattle in Indonesia". The objectives include development of dairy cattle with adaptation to the climatic conditions of highlands and lowlands of Indonesia, training for and implementation of a pilot milk recording program to assist in dairy cattle improvement, and involvement to assure success of the program. The plans also provide for economic procedures of importing superior stock, building on previous preliminary trials with embryo transfer and artificial insemination.

17.1.2 Assistance to Beef Cattle & Buffalo Program (W)

Dr. Peters has been working with the Government on plans for recording and selective improvement of the established Indonesian beef breeds, the Ongole, Bali and Madura cattle; for developing sound beef cattle cross-breeding programs on BMT and other ranches; and for recording and selective improvement of the buffalo in a 1,000 cow herd on BMT territory in Sumba.

17.1.3 Dairy Goat Breeding and Production (W)

He has helped in developing the dairy goat breeding project, using frozen semen of the alpine and Aglo-Nubian breeds on Indonesian Etawah does at the Cilebut Research Station. The project has evolved into a comprehensive program entailing the collection of data on climatic adaptation of the crossbreeds to be produced and their total merit in production of milk, meat and other saleable body parts. Research on processing of goat milk for production of cheese, yoghurt and butter is planned as a component of the project.

17.1.4 Outreach Pilot Project (W)

This is a multi-disciplinary project of assistance to Bogor area villagers on production of sheep and goats. The writer has participated on the breeding side in development of recording procedures and in monitoring the program.

17.1.5 Training (W)

Dr. Peters has made available, to the staff, materials detailing the procedures of performance testing, recording and selection in beef cattle, dairy cattle, sheep and swine in Canada, and results of cross-breeding evaluation studies in the United States. These materials are now installed in the BPT Library. Other initiatives in this area have included advising on research and treatment of data, and reviewing of scientific papers for publication. The importance of fodder development is stressed for all livestock programs.

17.1.6 Study of the Animal Industry (W)

During the months Dr. Peters has been in Indonesia, he has made a number of long trips in Java, Bali, Sulawesi and Eastern Indonesia. The major purpose of this travel was to obtain first-hand information on requirements for projects in animal breeding, with particular reference to large ruminants. The report is entitled "Report on a Study of Animal Industry in Java, Bali, Timor and South Sulawesi - October and November, 1984".

17.2 Future Program

17.2.1 Assistance to Dairy Cattle Program (W)

During the remainder of his assignment in Indonesia he will continue the activities already mentioned.

17.2.2 Embryo Transfer Research (W)

He will concentrate some of his efforts on this program and help with preparations for a workshop on embryo transfer.

18 Joel Levine Animal Breeder and Farming Systems Expert RIAP

18.1 Accomplishments

18.1.1 Research on Farming Systems (W)

He conducted with his counterparts a socio-economic village level survey of livestock production systems in fifteen villages in estate crop areas of North Sumatra in cooperation with staff of the Sub-Balai. He helped the Farming Systems Group to develop a budget and workplan to participate in the upcoming Upland Watershed Research Project in Central and East Java.

18.1.2 Characterization of Cattle Breeds (W)

With the exception of some data on sheep and goats in West Java there is little good production data on the major livestock breeds in Indonesia. On farm survey activities are planned to collect data on Bali cattle, Ongole cattle and their crosses and a compaison of different sheep and goat breeds.

The Bali cattle surveys are planned to begin in late February in Kupang, NTT and South Sulawesi, in areas of large concentrations of Bali Cattle. The Kupang survey will be part of a baseline survey effort to help start activities at the new sub-Balai planned there.

Using BPT's sub-Balai in Klepu, Central Java as a base, survey work is planned in Central Java to obtain basic production information on the Ongole breed and the many crosses in this region.

18.1.3 Multi-Year Farming Systems Plan (W)

He assisted in developing a multi-year farming systems/animal breeding research plan to evaluate major large breeds of livestock (cattle and buffalo) in Central and West Java, NTT, and South Sulawesi.

18.1.4 Assistance to Breeding Staff (W)

One of his major assignments in which he has been active during the three months he has worked for the AARP is to assist the Research Institute for Animal Production's staff in statistical analysis and technical write-up of existing data and experimental work.

18.1.5 Publications with Staff of RIAP (W)

In cooperation with the staff he has prepared the following publication:

1. The Status of Ruminants in Indonesia with Special Reference to Research Needs. (background material on research priorities prepared for USAID).

18.1.6 Procurement (W)

He has assisted CRIAS in compiling an equipment list for assistance under the AARP.

18.2 Future Program

18.2.1 Survey Research (W)

He will assist in the collection of good data from field surveys and monitoring of major breeds of cattle and buffalo. These surveys will be conducted with the staff and will provide training in survey research methodologies.

18.2.2 Breeding Research (W)

He will assist the CRIAS/RIAP breeding staff to develop the capability to store, analyse and write up results of data gathering activities. He will help them to use computers in their research activities.

18.2.3 Monitoring and Evaluation of New Technologies (W)

He will work with the staff on the monitoring and evaluation of the introduction of new technologies in mixed farming systems, especially in the Citanduy watershed area and other watershed project areas. Livestock and livestock related activities (e.g., leguminous feeds) are part of the Citanduy and new watershed projects. Dr Levine will assist with developing these activities and especially developing a computerized monitoring system to collect and store data.

18.2.4 Data Processing and Analysis (W)

A number of previous surveys and breeding experiments have been conducted but data not properly stored nor analyzed. With the present limited availability of microcomputers and possible future procurments of additional units, he will work with the staff to set up computerized data collection, storage and analysis techniques. This will include training of counterparts in use of the new computers. This has been identified as a major constraint to research activities in BPT.

19 Ruth Gatenby - Environmental Physiologist RIAP

19.1 Accomplishments

19.1.1 Surveys on Sheep and Goats (W)

She spent three weeks in Ciburuy, Garut and Cirebon, collecting data on the second phase of the survey to study houses for sheep and goats. Dr Gatenby and her counterparts conducted farmers' meetings in each village to inform the farmers why they were examining their kandangs (pen or house for goats and sheep) carrying strange looking instruments.

19.1.2 Outreach Pilot Project (W)

The Operational Pilot Project in which members of the scientific staff of BPT are testing out their research findings on farms in the Bogor District is now underway. She was involved in the preliminary meetings with the DINAS Peternakan and the farmers, and then to distribute the animals and funds for the kandangs to the farmers.

Each month she goes with a team of scientists to the villages in this project which is aimed at studying the transfer of new technology to the villages.

19.1.3 Creation of Environmental Physiology Program (W)

She has assisted BPT to set up an environmental physiology program and to acquire some of the necessary equipment.

19.1.4 Film on Small Ruminants (W)

Dr. Gatenby is assisting in the production of a film on small ruminants in West Java and the role of BPT in improving productivity. This project is being assisted by Winrock International and the USAID.

19.1.5 Data Analysis (W)

She has been involved in trying to analyse some of the many data obtained by BPT staff over the last five years on the productivity of village sheep and goats. At present this data is on the computer, but it is uncorrected, incomplete and not analysed. She is analyzing as much of the data as possible.

19.1.6 Publications (W)

In cooperation with her counterparts she has prepared two papers which have been accepted for presentation at the Australian-Asian conference on Animal Production to be held in Korea in May 1985. These are (1) a general review of the principles of animal housing in the tropics, and (2) some results from the survey of sheep and goat housing in West Java. She has also been asked to present a paper on the role of women in animal production.

In addition she is helping several scientists from BPT to prepare their papers in english for presentation at the conference in Korea.

19.2 Future Program

19.2.1 Assistance to Lili Station (W)

She has volunteered to be stationed at the Lili Station in Timor to help get its research program underway. If the Director of BPT agrees with this, she would move to Kupang in September 1985 to work with the new staff and at the proposed site for the institute.

19.2.2 Surveys on Sheep and Goats (W)

She will continue her research work in cooepration with the staff on sheep and goats. The environomental laboratory will be used to analyse this data. She will be training her counterparts in research methodology and computer use in data analysis.

19.2.3 Outreach Pilot Project (W)

Dr. Gatenby will continue to assist this project. The aims of this project are to test out in the villages new ideas which have evolved from the current research programs, to see what levels of production can be achieved in the villages, to study the problems of introducing new technology to traditional farmers, and to strengthen the awareness of the scientific staff at BPY to the villagers and their needs. At present there are 10 cooperating groups of farmers who have each been supplied with 6 sheep or goats and money to build a kandang. These farmers are visited each month and the technical performance of the animals is assessed.

19.2.4 Data Analysis and Publications (E)

III. OVERSEAS TRAINING

III. OVERSEAS TRAINING.

This was a very disappointing quarter for overseas training, as the Project failed completely to process the departure of any candidates during this period. This eliminated from the program five candidates for the USDA training course in management of Agricultural Research Facilities, four candidates for the Stanford Food Research Institute training course in Microcomputers and Development and four candidates from the Banjarmasin Research Institute for Food Crops who were scheduled to do a three country study of Deepwater Rice Research organized by IRRI. In addition, four candidates from the Agency for Forestry Research and Development failed the ALIGU test and they were unable to begin training for which they had been scheduled, two in Turkey, one in Pakistan and one in the Philippines.

The principal problem has been an unpublished "regulation" of the Central Planning Agency, Bappenas, over which there has been considerable confusion. According to USAID officers, no such Bappenas regulation applies to USAID financed training activities. However, AARP requests to Bappenas for clearance of candidates have remained unanswered, and discussions at Bappenas strongly indicated they were turned down because the scheduled training programs were of less than three months duration. The AARP/RMI Training Specialist, Mr. Fritz, participated in two of these meetings at Bappenas. At the end of the quarter, it was understood that Bappenas was processing clearance of the Deepwater Rice Team. When received IRRI will be requested to reschedule the program.

Thirteen AARP participants were in overseas training during the quarter. Three of these completed training in July, nine in August and the last one in September. Thus no AARP participants were in training at the end of the quarter.

During July Mr. Soebroto of USAID conducted the ALIGU test and Mr. Fritz interviewed training candidates at Lembang,and Sukamandi. Of twenty taking the test at Lembang, six passed at the I level and the remainder failed. Of 41 taking the test at Sukamandi, four passed at the I level and six at the II level. Some of those passing the test are not yet Government servants, so are ineligible for training.

Of 22 candidates taking the test at USAID/Jakarta during the quarter, three passed at the I level and two at the II level.

As of September 30, 1984 AARP had sent 82 participants abroad for 166.8 manmonths of training. A listing of the 82 particpants is found at APPENDIX VI.

With expectation that USAID will agree to diversion of loan funds from overseas training to in-country training, a start has been made in developing plans for such programs. These include English language training and training in experiment station management and microcomputers.

****

LIST OF AARP/RMI PARTICIPANTS AS OF DECEMBER 31, 1984

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MAN-MOS
	DEPARTURES					
1.	Muhrizal Sarwani	BARIF	Legume Inoculation	NIFtal Project Univ. of Hawaii	Dec. 1, 1984 April 30, 1985	1.0
	CONTINUING IN TRAINING					
2.	Hamban Prayudi	BARIF	Fungicide Resistance	University Pertanian, Malaysia	Oct. 17, 1984 - Jan. 15, 1985	2.5
3.	Hartini Ramelan	BORIF	Bacterial Leaf Blight	IRRI, Philipoines	Oct. 30, 1984 - Feb. 27, 1985	2.07
	RETURNEES					
4.	Supamani	FPRI/Bogor	Individual Research on lateral strength of fastener.	USDA Forest Products Laboratory, Madison, Wisconsin.	Mar.26 - Sept.25, 1984	6.0
5.	Darti Satyani	RIIF/Bogor	Freshwater Prawn Program	Univ. of Hawaii, Manoa, Honolulu	Jun. 2 - Aug 5, 84	2.17
6.	K. Dwiyanto	RIAP/Bogor	Rabbit Research Program	Oregon State Univ, Oregon, USA.	May. 4 - Aug. 14, 84	3.08
7.	B. Sudaryanto	RIAP/Bogor	-do-	-do-	May 14 - Aug. 14, 84	3.08
8.	Ami Lasmini	RIAP/Bogor	-do-	-do-	May 14 - Aug. 14, 84	3.08
9	Agus Nurhadi	RIAD/Bogor	-do-	-do-	May 14 - Aug. 14, 84	3.08
10.	S. Pawirodiodo	RIAP/Bogor	-do-	-do-	May 14 - Aug. 14, 84	3.08
11.	E. Djamaludin	CRIAS/Bogor	Research Communications Applicable to animal science.	Winrock International Arkansas, USA.	May 28 - Aug. 27, 84	3
12.	D. Kosasih	RIAP/Bogor	-do-	-do-	May 28 - Aug. 27, 84	3

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MM-YY
13.	Wafiar Akib	SURIF/Sukamandi	Integrated Pest Management	Purdue Univ, Lafayette, USA	Jun.15 - Jul.20, 84	1,[illegible]
14.	Hendarsih Suharto	MDRIF/Maros	-do-	-do-	Jun.15 - Jul.20, 84	1,[illegible]
15.	P. Sukartana	FPRI/Bogor	Wood Entomologi, Ambrosia Beetles	University of Wisconsin, Madison, USA.	Jan. 3 - Jul. 2, 1984	6
16.	E. Suratman	RIAP/Bogor	Theory of Field Machinery	Asian Institute of Technology Bangkok, Thailand.	Jan. 3 - Apr. 7, 1984	3.[illegible]
17.	H. Surachman	do	do	do	do	3.[illegible]
18.	Farid A. Saleh	BARIF/Banjarmasin	Dissemination of Research Results	International Rice Research Institute, the Philippines	Nov. 1 - March 1984	4.0[illegible]
19.	F. Kasryno	CAER/Bogor	The Structure of Economic Research and Data Processing Management Training Program.	Economic Research Service, USDA, and Dept. of Agricultural Economics, Michigan State University.	Jan 16 - 27, 1984	0.3[illegible]
20.	C.A. Rasahan	do	do	do	do	0.3[illegible]
21.	Hermanto	do	do	do	do	0.3[illegible]
22.	Yanti Rina Darsani	BARIF/Banjarmasin	Techniques and Methodologies of Agric. Economics	International Rice Research Institute, the Philippines	Oct. 13 - Dec. 9, 1983	1,[illegible]
23.	Maria T. Anitawati	CAER/Bogor	do	do	do	1,[illegible]
24.	N. Mahrita Willis Abidin	BARIF/Banjarmasin	Integ. Pest Management	do	Aug. 15 - Nov.25, 1983	3,[illegible]
25.	Djajeng Sumangat	BORIF/Bogor	Determination & Prevention of Post Harvest Food Losses	Univ. of Idaho, Postharvest Inst. for Perishables, Idaho Falls U.S.A.	Sept. 4 - Oct.14, 1983	1,3[illegible]
26.	Durlung Muhidin	BORIF/Ps. Minggu	do	do	do	1,3[illegible]
27.	Iis Syamsiah	SURIF/Sukamandi	Water Management	International Rice Research Institute, the Philippines	Aug.10 - Sept.16, 1983	1,[illegible]

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MAN-MOS
28.	Nadjib Noor	MORIF/Maros	Training Computer	The Asian Inst. of Technology Reg. FARMAP Trg. Center for Asia & The Pacific, Thailand	Aug. 8 - Aug. 26, 1983	0.63
29.	Hadijah A. Dahlan	do	do	do	do	0.63
30.	Sri Sumastri	RIIF/Bogor	Brackish Water Aquaculture	Taiwan Fisheries Research Keelung, Taiwan	July 9 - Sept. 9, 1983	2
31.	Amin Ismail	RIIF/Jakarta	do	do	do	2
32.	Agus Priyono	RIIF/Bali	do	do	do	2
33.	Sunriyono Eko Wardoyo	RIIF/Maros	do	do	do	2
34.	Tadjuddin Dalay	RIIF/Bogor	do	do	do	2
35.	Tridioko	RIIF/Bali	do	do	do	2
36.	Waluyo Subani	RIMF/Jakarta	Library Training	International Center for Living Aquatic Res. Management in Manila, the Philippines	June 6 - July 6, 1983	1
37.	Endang Pratiwi	CRIF/Jakarta	do	do	do	do
38.	Rachmat	NLAS/Bogor	do	do	do	do
39.	Tuti Sulasmi	NLAS/Bogor	do	do	do	do
40.	Novenny A. Wahyudi	RIIF/Bogor	Aquaculture Trg. Program	Auburn Univ. Alabama, USA	March 18 - July 15,1983	4
41.	Purwito Martosubroto	RIMF/Jakarta	R&D Management Consultancy Training	Denver Res. Inst. Denver	May 23 - July 1, 1983	1.3
42.	Ati Sri Duriat	LERIH/Lembang	Elisa Techniques	American Type Culture Center in Rockville Maryland, USA.	Feb. 20 - June 9, 1983	3,6

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MAN-MO.
43.	Nani Sumarni	LERIH/Lembang	Interdisciplinary Research in Plant Breeding	Asian Vegetable Res. & Dev. Center, Taiwan.	Nov. 7 - May 7, 1983	6
44.	Etti Purwati	do	do	do	do	do
45.	Yoyo Sulyo	do	do	do	do	do
46.	R. E. Suriaatmadja	do	do	do	do	do
47.	Kosasi Kadir	FPRI/Bogor	Woodworking & Drying & Research Project Planning & Evaluation.	Forest Products R&D Inst. Los Banos, the Philippines	March 7 - April 7, 1983	1
48.	Mas Ismunadji	BORIF/Bogor	Spec. Trg. in Upland Crops Physiology	Asian Vegetable Res. & Dev. Center, Taiwan.	Nov. 11 - Dec. 1, 1983	0.7
49.	Mochamad Sirdan	CAPP/Jakarta	Project Preparation & Evaluation in Ag. and Rural Development	Statistical, Economic and Social Research & Training Center for Islamic Countries Turkey.	Oct. 18 - Nov. 12, 1982	0.9
50.	Syafril Lamsayun	CARP/Jakarta	Procurement Training	TransCentury Corp, USA.	Oct. 15 - Nov. 14, 1982	1
51.	Abdussamad Syahrani	BARIF/Banjarmasin	Procurement Training	TransCentury, USA.	Oct. 15 - Nov. 14, 1982	1
52.	A. L. Laponangi	MORIF/Maros	do	do	do	1
53.	Warsito Hutomo	CAQ/Jakarta	Agric. Proj. Planning & Analysis, Section II	USDA, Washington, DC, USA.	Sept. 7 - Nov. 11, 1982	2,2
54.	Mohamad Mansur	CRIIC/Bogor	do	do	do	do
55.	Hafni Zahara Syukri	CARP/Jakarta	do	do	do	do
56.	Wahyadi Sosrowardoyo	CRIFI/Jakarta	Applic. and Diffusion of Agric. Res. Results to the Community Level.	Iowa State Univ. USA.	Aug. 25 - Oct. 1, 1982	1,3

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MAN-MOS
57.	Sofyar Ilyas	RIFT/Jakarta	Determination & Post Preventation of Postharvest Food Losses.	Cornel. University, USA	Sept. 6 - Oct. 13, 1982	1,3
58.	Achmad Hidayat	CAQ/Jakarta	Plant Quarantine	USDA, Washington, DC, USA.	July 19 - Sept.17,1982	2,3
59.	Dewa M. Tantera	BORIF/Bogor	Integrated Pest. Mgnt.	Purdue University, USA.	June 9 - July 23,1982	1,5
60.	Sudiarto	CRIIC/Bogor	Agric. Research Method	Kansas State Univ. USA	May 31 - July 23,1982	1,8
61.	Lalu Sukarno	BORIF/Bogor	do	do	do	do
62.	Siti Sufiani	MORIF/Maros	do	do	do	do
63.	M. Saleh Pandang	MORIF/Maros	do	do	do	do
64.	Wafiah Akib	MORIF/Maros	do	do	do	do
65.	Tambak Manurung	CRIAS/Bogor	Agric. Research Method	Kansas State Univ. USA	May 31 - July 23, 1982	1,8
66.	Didi Suardi	CRIFC/Bogor	do	do	do	do
67.	Yono C. Rahardjo	CRIAS/Bogor	do	do	do	do
68.	Budhojo Sukotio	Prof. & Proj. Form Unit/Jkt.	Agric. Research Mgnt.	Washington, DC and Hawaii, USA.	June 6 - 12, 1982 June 18 - 21, 1982	0.4
69.	Tambunan S.M. Marungkol	BORIF/Bogor	Estab. Data Bases & Analist. Syst. for Econ. Decision Making in Agric.	University of New Mexico, USA.	June 6 - Aug.13, 1982	2,3
70.	Rachmat Kartapradja	LRIF/Lembang	Veg. Crop. Prod. & Market	Rutgers University, USA	July 12 - Aug. 20,1982	1,3

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MAN-MOS
71.	Artaty Wijono	CRIFI/Jakarta	Ag. Comm. & Med. Strategy	Iowa State University, USA	July 12 - Aug. 20, 1982	1,3
72.	Abisono	TARII/Tg. Karang	do	do	do	do
73.	Adi Widjono	CRIFC/Bogor	do	do	do	do
74.	T. H. Mangunsong	Reg. Ag. Quarant/ Bogor	do	do	do	do
75.	Fathan Muhadjir	BORIF/Bogor	Wheat & Maize Phys.	CIMMYT, Mexico City, Mexico.	July 20 - Aug. 25, 1982	1
76.	Nurlaila Hasbullah	BORIF/Banjarmasin	Rice Production	IRRI, the Philippines	July 1 - Aug. 27, 1982	1,9
77.	Nurul Aida	BORIF/Banjarmasin	do	do	do	do
78.	Achmad Dimyati	BORIF/Bogor	Tech. & Econ. Aspects of Soybean Production	University Illinois, USA	May 10 - Aug. 6, 1982	2,9
				TOTAL MANMONTHS OF TRAINING UNDER RMI CONTRACT		166.19

NO.	NAME	EMPLOYING OFFICE	COURSE/OBJECTIVES	INSTITUTION/COUNTRY	DURATION	MAN-MONTHS
	TRAINING OUTSIDE RMI CONTRACT					
79.	Achmad Samita	RIIF/Bogor	Study Milkfish Qultiv. Method.	SEAFDEC/Philippines Inst. of Marine Biology & Gulf Coastal Fish. Center/USA SEARCA/the Philippines	July 5 - Aug. 15, 1981	1,4
80.	Haniah	do	do	do	do	1,4
81.	Suningat	NIAS/Bogor	Regional Micrographic	SEARCA/the Philippines	Jan. 10 - 23, 1982	0.5
82.	Sumardi Dahlan	do	do	do	do	0.5
83.	Azis Arifin	LERIF/Lembang	The Decimal Long of Cip. Comparative Study for TUBER Crops Research Comparative for Wheat Research	Pery CIAR/Columbia CIMMYT/Meico	Feb. 22 - 26, 1982 Feb. 29 - March 1, 1982 March 3 - 4, 1982	0.3
84.	Surahmat Kusumo	CRIFC/Bogor	do	do	do	0.3
85.	Sundaru	BORII/Bogor	Management Agric. Organ	USDA/USA	May 17 - July 9, 1982	1.8
				TOTAL MANMONTHS TRAINING OUTSIDE RMI CONTRACT		6,2
					GRAND TOTAL	172.39

IV. FINANCIAL REPORTS

IV. FINANCIAL SITUATION UNTIL DECEMBER 31, 1985

Departemen Pertanian
BADAN PENELITIAN DAN PENGEMBANGAN PERTANIAN
PROYEK PENELITIAN DAN PENGEMBANGAN PERTANIAN RI – USAID
PROYEK PEMBANGUNAN PRASARANA PENELITIAN PERTANIAN
(Applied Agricultural Research Project)

Jalan Pegunun 'ri
Pasar Minggu
Jakarta

Telepon : 782202 (4 saluran)
Kawat : LITANI JAKARTA

M E M O

November 14,1984

To : Mr.Soedasrip Hardjoprajitno

From : Moestadjab

Subject : Monthly Financial Report
Applied Agricultural Research Project
as of October 30, 1984

The following data is submitted as requested with a summary table attached.

I. Technical Assistance

1. Eighteen RMI longterm consultants were on duty as of October 30, 1984. Two short term consultants : Dr.Gunawan Satari and Dr.Soewarno Sukarto were assigned for one month services respectively in the area of "Postharvest Evaluation of Tuber and Fruit Crops".

2. Status of Technical Assistance

	Contracted	Supplied	Committed	Balance
a.Long term				
Manmos	630*	335	506#	136
b.Short term				
Manmos	24	10.26	11	13
c.Funding	6,468.000,- **	2,896,794.97	5,030,950,-	1,437,050

*To end of existing RMI employee contracts.
**Does not include miscellaneous e.g.Educational Allowances,Visa Maintenance,Contingencies for inflation,etc.for period of October 1984.
Inclusive : 12 manmos extension of J.L.McIntosh
12 manmos extension of R.E Harwood
13 manmos of J.Bolton which were unused

V8

Monthly Financial Report
Applied Agricultural Research Project
as of October 30,1984

II. Training

1. Progress as of October 30,1984

	RMI	Outside	Total
Target			
No	200	7	207
Manmos	557	6.2	563.2
Funding	1,849,000	NA	NA
Complete			
No	75	7	82
Manmos	161.19	7	168.19
Funding	560,039.78		
Balance Remaining			
No.	75	7	82
Manmos	395.81	7	402.81
Funding	1,289,117.22		

III. Construction

1. Funds available in USAID Loan Agreement	: $ 7,140,000
2. Expended as of October 30,1984	: 587,202.18
3. Balance to be expended	: 6,822,797.82

IV. Equipment

1. Funds available in Loan Agreement	: $ 6,061,000
2. Expended as of October 30,1984	: 587,202.18
3. Balance to be expended	: 5,473,797.82

Monthly Financial Report
Applied Agricultural Research Project
as of October 30,1984

V. Vehicles

1.Funds available in Loan Agreement (including 10% contingency and 30% inflation)	:	$ 1,423,600.0
2. Expended as of October 30,1984	:	776,591.0
3.Balance to be expended	:	647,009.0

copy : Dr.Sadikin, D.G AARD
Mr.A.R Hurdus, USAID
Dr.W.L Collier
Mr.R Saunders

AARP MONTHLY FINANCIAL SUMMARY

as of October 1984

No.	ITEM	FUNDS		EXPENDED /COMMITTED		BALANCE	
		GRANT	LOAN	GRANT	LOAN	GRANT	LOAN
1	2	3	4	5	6	7	8
1.	TECHNICAL ASST.	6,468,000		3,210,025.47		3,257,974.53	
2.	TRAINING		1,849,157		560,039.78		1,289,117.22
3.	CONSTRUCTION		7,140,000		587,202.18		6,694,117.34
4.	EQUIPMENT		6,061,000		4,500.00		6,056,500
5.	VEHICLES		1,423,600		776,591.00		647,009
	TOTAL	6,468,000	16,473,757	3,210,025.47	1,928,332.96	3,257,974.53	14,686,743.56

Departemen Pertanian
BADAN PENELITIAN DAN PENGEMBANGAN PERTANIAN
PROYEK PENELITIAN DAN PENGEMBANGAN PERTANIAN RI – USAID
PROYEK PEMBANGUNAN PRASARANA PENELITIAN PERTANIAN
(Applied Agricultural Research Project)

Jalan Raguman 20
Pasar Minggu
Jakarta

Telepon : 782202 (4 saluran)
Kawat : LITANI JAKARTA

M E M O

December 16,1984

To : Mr.Soedasrip Hardjoprajitno

From : Moestadjab

Subject : Monthly Financial Report
Applied Agricultural Research Project
as of November 30,1984.

The following data is submitted as requested with a summary table attached.

I. Technical Assistance

1. Nineteen RMI longterm consultants were on duty as of November 30, 1984.

2. Status of Technical Assistance

	Contracted	Supplied	Committed	Balance
a. Lonn term Manmos	630*	354	506	136
b. Short term Manmos	24	10.5	10.5	13.5
c. Funding	6,468.0	** 3,057,637.66	5,030.95	1,437,050

*To end of existing RMI empoyee contracts.
**Does not include miscellaneous e.g.Educational Allowances,Visa Maintenance,Contingencies for inflation,etc. for period of November 1984.

Monthly Financial Report
Applied Agricultural Research Project
as of November 30,1984

II. Training

1. Progress as of November 30,1984

	RMI	Outside	Total
Target			
No.	200	7	207
Manmos	557	6.2	563.2
Funding	1,849,157	NA	NA
Complete			
No	75	7	82
Manmos	163.19		
Funding	560,039.78		
Balance Remaining			
No	125		
Manmos	393.81		
Funding	1,289,117.22		

III. Construction

1. Funds available in USAID Loan Agreement	:	$ 7,140,000
2. Expended as of November 30,1984	:	690,848.40
3. Balance to be expended	:	6,449,151.60

IV. Equipment

1. Funds available in Loan Agreement	:	$ 6,061,000
2. Expended as of November 30,1984	:	587,202.18
3. Balance to be expended	:	5,473,797.82

Monthly Finacial Report
Applied Agricultural Research Project
as of November 30,1984

V. Vehicles

1. Funds available in Loan Agreement (including 10% contingency and 30% inflation)	:$ 1,423,600.0
2. Expended as of November 30,1984	: 776,591.0
3. Balance to be expended	: 647,009.0

copy : Dr.Sadikin , D.G AARD
Mr.A.R Hurdus, USAID
Dr.W.L Collier
Mr.R.Saunders

AARP MONTHLY FINANCIAL SUMMARY

as of November 1984

NO.	ITEM	FUNDS		EXPENDED /COMMITTED		BALANCE	
		GRANT	LOAN	GRANT	LOAN	GRANT	LOAN
1	2	3	4	5	6	7	8
1.	TECHNICAL ASST.	6,468,000		3,210,025.47		3,257,974.53	
2.	TRAINING		1,849,157		560,039.78		1,289,117.22
3.	CONSTRUCTION		7,140,000		690,848.40		6,449,151.60
4.	EQUIPMENT		6,061,000		4,500.00		6,056,500
5.	VEHICLES		1,423,600		776,591.00		647,009
	TOTAL	6,468,000	16,473,757	3,210,025.47	2,031,979.18	3,257,974.53	14,441,778.82

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Departemen Pertanian
BADAN PENELITIAN DAN PENGEMBANGAN PERTANIAN
PROYEK PENELITIAN DAN PENGEMBANGAN PERTANIAN RI – USAID
PROYEK PEMBANGUNAN PRASARANA PENELITIAN PERTANIAN
(Applied Agricultural Research Project)

Jalan Tegalan 29
Pasar Minggu
Jakarta

Telepon : 782202 (4 saluran)
Kawat : LITANI JAKARTA

M E M O

January 21,1985

To : Mr.Soedasrip Hardjoprajitno
AARP Project Leader

From : Moestadjab
AARP/RMI Adm.Specialist

Subject : MONTHLY FINANCIAL REPORT
APPLIED AGRICULTURAL RESEARCH PROJECT
as of December 30,1984

The following data is submitted as requested with a summary attached.

I.TECHNICAL ASSISTANCE

1.Nineteen RMI longterm consultants were on duty as of December 30, 1984. Ir. Sujendro Abdulmuin , Construction Expert, left the project effective December 1, 1984; but he was replaced at the same date by Ir.Soenarso who will continue the assignment of Construction Expert up to September 1985.
Ir.Burhanuddin is being processed to fill the post of Computer Specialist in AARP for short terms basis with six months assignment.

2. Status of Technical Assistance

	Contracted	Supplied	Committed	Balance
a.Long terms Manmos	*630	373	493 #	137
b.Short terms Manmos	24	10.5	10.5	13.5
c.Funding	$ 6,468,000.0	**3,210,025.47	4,950,940.0	1,517,060.0

* To end of existing RMI employee contracts.
** Does not include miscellaneous e.g Educational Allowances, Visa Maintenance,Contingencies for inflation, etc. for period of December 1984. It does include committments for social charge and overhead only.
\# 506 manmos(committed) less 13 unused manmos of J.Bolton.

MONTHLY FINANCIAL REPORT
APPLIED AGRICULTURAL RESEARCH PROJECT
as of December 30, 1984.

II. TRAINING

	RMI	OUTSIDE	TOTAL
Target			
No..	200	7	207
Manmos	557	6.2	563.2
Funding	$ 1,849.2	NA	NA
Complete			
No	78	7	
Manmos	166.19	6.2	172.39
Funding	$ 617,345.0	NA	
Balance Remaining			
No	122		
Manmos	390.81		
Funding	$ 1,231,812.0	NA	

III. CONSTRUCTION

1. Funds available in USAID Loan Agreement	:$ 7,140,000.0
2. Expended as of December 30,1984 for prefinancing	:$ 789,463.34
3. Balance to be expended	:$ 6,350,536.66

IV. EQUIPMENT

1. Funds available in USAID Loan Agreement	:$ 6,061,000.0
2. Expended as of December 30, 1984 for prefinancing	:$ 4,500.0
3. Balance to be expended	:$ 6,056,500.0

cont'd ,..... 3/

APPLIED AGRICULTURAL RESEARCH PROJECT
as of December 30,1984

V. VEHICLES

1. Funds available in USAID Loan Agreement (including 10% contingency and 30% inflation)	:$	1,423,600.0
2. Expended as of December 30,1984	:$	776,591.0
3. Balance to be expended	:$	647,009.0

Copy : Dr.Gunawan Satari, DC AARD
Mr.A.R Hurdus, USAID
Dr.W.L Collier
Mr. R.Saunders

AARP MONTHLY FINANCIAL SUMMARY

as of December 31,1964

No.	ITEM	FUNDS		EXPENDED /COMMITTED		BALANCE	
		GRANT	LOAN	GRANT	LOAN	GRANT	LOAN
1	2	3	4	5	6	7	8
1.	TECHNICAL ASST.	6,468,000		3,210,025.47		3,257,974.53	
2.	TRAINING		1,849,157		617,345.0		1,231,812.0
3.	CONSTRUCTION		7,140,000		789,463.34		6,350,536.66
4.	EQUIPMENT		6,061,000		4,500.00		6,056,500
5.	VEHICLES		1,423,600		776,591.00		647,009
	TOTAL	6,468,000	16,473,757	3,210,025.47	2,187,899.34	3,257,974.53	14,285,857.66

APPENDIX I

QUARTERLY ACTIVITY REPORTS FOR THE AARP/RMI SPECIALIST TEAM STATIONED IN BOGOR AND JAKARTA

QUARTERLY REPORT

FOR

OCTORBER, NOVEMBER AND DECEMBER 1984

BY

WILLIAM L. COLLIER

My main assignment was to assist the Team Leader during this quarter which I tried to do as best as I could. It requires attending a large number of meetings and writing memos and letters to help carryout the various activities. I also must visit many officies to help move the progarm a long.

The major task was still the extension of the project. In order to develop the PACD extension document there has to be many meetings and changes in the plan. Fortunately, most of the tables are on my computer so that I can quickly revise them with the new numbers. This has been an extremely time consuming activity.

The preparations continued for the Research Management Workshop which was held in November in Sukamadi. I spoke about the utilization of foreign experts by the Agency.

To assist the Secretariate, I helped them prepare the TOR for the IFARD-AARD Workshop which will be held in Jakarta.

A number of meetings were held on developing the program for the Swamps II project. Since I did five years of research on tidal swamp farming systems, I have been deeply involved in the deveopment of the program which will be submitted to AARD and the World Bank.

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During this period I also helped again with the Computer Tender which is requiring a lot of time and effort. We are reaching the point where soon we can invite suppliers in Jakarta to bid for the computer tender. It took three very intensive days of work to translate the computer tender document into Indonesian. We had to go line by line to check the meaning of each sentence.

To help with the initiation of new projects, I assisted the Secretariate by having meetings with the World Bank on the Swamps II project and with USAID on the Aquatic Reseources Project.

I assisted the Secretary in the Kepas activity which is a very useful group doing work on agroecosystems research. Unfortunately, I have not been able to attend several of their workshops because of my responsibilities with the AARP.

ACTIVITIES REPORT FOR OCTOBER-NOVEMBER-DECEMBER 1984

R.E. HARWOOD

Work continued during October on the construction plans for forestry in Samarinda and the animal disease installations in Banjarbaru. All arrangements have been made to buy the land needed for the access road to the animal disease construction site.

A pilot project in experiment station development and management, planned for Banjarbaru, has been presented to USAID. If approved, machinery will be bought locally and development of twelve hectares for experimental plots will begin. Work will include clearing, mapping, land forming, roads, fences, drainage, and irrigation. People to be trained in all phases of the work include station managers, tractor drivers, surveyors, irrigators,, etc. The development work will be done in part by the people who later will maintain and manage the station. Small contracts will be let for fencing, culverts, etc, but all contract work will be supervised by station personnel. Station design, land clearing, land forming, drainage and irrigation work, will be done by our agricultural people.

November 1-3, I was in Banjarbaru. The construction of the laboratory and office buildings should be completed by January 1985. The housing construction is far behind schedule and ways and means are being sought to speed up this work. Also, the PLN electrical installation to our construction sites is urgently needed so the buildings can be used as soon as they are finished. The two month maintenance period on new buildings is of little merit if the buildings are not being use.

I made some test borings along the site of the proposed ditch and dike for the planned drainage system of the station. The soil type is suitable for this proposed system.
December 2, 3, 4, 5, 6, I was in Banjarmasin with Mr. Komar and Mr. Soenarso who is our new construction program engineer. The first housing contract is 77% finished and a new contract will be let to finish this work.

A proposed pilot project of farm development and management, with training in both disciplines, was discussed with Dr. Anwarhan and his administrative personnel.
December 14, 15, 16 (Friday-Saturday-Sunday) were spent on a trip to East Timor. The proposed station site is at Maliana, about a half hour flight from the capital of Dili. There are two flights a week, one on Saturday and one on Monday. The trip by road in the dry season takes about seven hours. From December thru April the roads are impassible.

The 100 H site has very good land, is about five kilometers from the town of Maliana, and appears to have a good potential for food crops. Much corn is grown in the area.

Hotel facilities are available in Dili. Two rooms are available at a government installation in Mariela.

Budget may be available during the next two years for the development of the agricultural lands at our new experiment stations. Plans are being made to begin this work as soon as budget is available.

REH:is

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
Jl. Merdeka 99
Bogor, Indonesia

November 7, 1984

To : Mr. Walter C. Tappan
IRRI Liaison Scientist

From : Jerry L. McIntosh
AARD/IRRI Farming Systems Liaison Scientist

Subject: Monthly Report - October 1984

I. Principal Activities and Accomplishments

A. Continued support to AARD staff for FSR.

1. Upland Agriculture and Conservation Project.

2. Upland Rice Research and Monitoring Tour

3. Edit papers.

B. Participation in International Farming Systems Symposium, Kansas State University, Manhattan, Kansas, October 8-11, 1984.

I was asked to present the Keynote Address and serve as one of the three "wrap up" speakers.

This Symposium has been held annually for the last 4 or 5 years. The Symposium was especially useful to me to see the approaches and techniques and for different kinds of farming systems in different parts of the world. There is a tendency to become narrow and perhaps isolated and to feel threatened by other research groups. I was impressed that even though the Indonesian research is scattered and perhaps not well coordinated, our experience in experimentation is very much ahead of other places. Our socio-economic research suffers from insufficient coordination and depth.

Ir. Soetjipto also attended the Symposium and presented a paper on Impact of Cropping Systems Research in Indonesia.

C. Participated along with Drs. Siwi Syarifuddin and Fagi in the International Rainfed Lowland Rice Conference, Bhubaneswar, Orissa, India, October 15-20, 1984.

This Conference focused on the pest management, breeding, agronomy and farming systems research for rainfed lowland rice. The situation for lowland rice in this part of India is quite different from much of the rainfed lowland rice in Indonesia. It is very much subject to weather conditions. Flooding is a major problem in the rainy season. Rainfall distribution is erratic. Consequently, there is still wide use of photo period sensitive rice varieties. Irrigation projects have been helpful to some areas but has caused flooding problems in other areas. With better irrigation and drainage systems this area could be much more productive.

D. Prepare paper for Upland Rice Conference.

II. Miscellaneous Activities

A. SMSS and SCS Consultation Review.

B. Crop/Livestock Project with Dr. Siwi. Mr. Inu and IDRC staff.

C. USAID - Upland Agriculture and Conservation Project planning.

III. Problems - None.

IV. Plans

A. Help get trials starting for Upland Rice Conference Monitoring Tour and Research.

B. Eastern Indonesia Agricultural Research Master Plan.

C. Coauthor papers for Upland Rice Conference.

JLM:fh

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
Jl. Merdeka 99
Bogor, Indonesia

December 4, 1984

To : Mr. Walter C. Tappan
IRRI Liaison Scientist

From : Jerry L. McIntosh
AARD/IRRI Farming Systems Liaison Scientist

Subject : Monthly Report - November 1984

I. Principal Activities and Accomplishments

A. Continued support to FSR

- Crop/livestock
- Upland Agriculture Farming Systems (Fertilizer Efficiency and Cropping Systems)
- Upland Agriculture and Conservation Project
- Training - short term and monitoring tours

B. Finish paper for Second International Upland Rice Conference (See Appendix).

C. Asian Farming Systems Economists Monitoring Tour (Nov. 14-16)

This group of economists who have or will work with the national farming systems research projects (Philippines, Thailand, Malaysia, Indonesia and IRRI) spent 3 days in looking at farming systems research in West Java. They were especially interested in seeing and discussing agro-economic research associated with the Upland Agriculture and Conservation Project. It is important in Indonesia to more directly involve the Center for Agro-Economic Research (CAER) with on-going farming systems research. Dr. Faisal accompanied the monitoring tour and indicated his interest in more actively supporting farming systems research projects.

The group visited the Ciamis area and inspected research activities in the Upland Agriculture and Conservation and Citanduy II Projects. Considerable interest was shown in developing better communications among socio-economists working in FSR research in South and Southeast Asia.

D. Farming Systems Support Project (FSSP)

Dr. Dan Galt of the FSSP, University of Florida, spent the week of November 19 in Indonesia at the request of USAID to study ways the FSSP might be supportive of farming systems research in Indonesia. Since this kind of research has been carried out over

the past 14 years, experiences in Indonesia are very important to programs in other countries that are much newer. Dr. Galt, however, felt there were at least 3 areas in which the FSSP could be useful even for older programs.

1. Provide expertise, particularly, for research areas that may not be covered by funding agencies and International Agricultural Research Centers (IARC).

2. Training

3. Organizing international conferences on regional and inter regional bases.

The FSSP is connected with many of the national research programs in Africa (60% of the budget is for Africa) and most of the programs involve research on animal and agro forestry systems. Better understanding of the problems and possibilities for research on these systems would be very useful.

E. Monitoring Tour of Fertilizer Efficiency and Upland Farming Systems research sites in Lampung and South Sumatra.

Messrs Soetjipto, Inu and I spent 3 days (November 29 through December 2) delivering seed and checking on upland rice and other agricultural research trials in Taman Bogo, Nakau, Batumarta and Way Abung. These trials serve several purposes. They will be used to demonstrate upland rice technologies and problems during the upland rice monitoring tour to be held late in February. But primarily they are part of a transect of research sites that have been established in upland agricultural areas in Sumatra, Kalimantan, Sulawesi and Java for the humid regions of Indonesia. These are fertilizer efficiency, cropping systems, varietal testing and pest and disease trials that will be carried out over a wide area for a long enough period of time to develop management systems that have agronomic, as well as socio-economic, stability and sustainability.

The plots that have been established look good. There are some specific points that should be mentioned as a result of our field visits.

1. Rice seeds obtained locally, in many instances, had very low levels of germination and vigor compared to seed coming from the research institutes. This is probably why we observe low plant populations, many times, in farmers' fields.

2. Rice varieties like Sentani which are early maturing and non-leafy should be planted at 25 or 30 cm row spacings rather than at 40 cm commonly used for other varieties.

3. Borreria is a very serious weed problem especially on land that has been opened for 3 years. The first year land is opened there is no problem. The second year some borreria survive and make seed. The third and following year this weed is a very serious problem and is probably the main reason why farmers reduce the area for food crops production.

4. Rubber trees that were first tapped last year in Batumarta have been badly scarred. This situation must be studied.

5. Develop simple tools (such as the wheel hoe) to reduce labor requriements on upland agriculture.

II. Miscellaneous Activities

A. Discuss upland agricultural production problems with Bappenas.

B. Other consultations

John Moes - Halcrow Fox Associates

Larry Harrington - Cymmit

Berry Nestle - ISNAR

C. Planning and papers for Upland Rice Conference.

D. Multiply and distribute research briefs of FSR in AARD.

III. Problems - None

IV. Plans

A. Continue to help monitor research on upland agriculture in humid areas of Indonesia.

B. Co-author papers for Upland Rice Conference (2) and for upland crops breeding.

C. Help develop the Eastern Indonesian Agricultural Development Program.

JLM:fh

COOPERATIVE CRIFC - IRRI PROGRAM
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CABLE ADDRESS :
IRRIAID BOGOR

MAIL ADDRESS
COOPERATIVE CRIFC - IRRI PROGRAM
IRRI - P.O. BOX NO. 107
Jl. Merdeka 99
Bogor, Indonesia

December 27, 1984

To : Mr. Walter C. Tappan
IRRI Liaison Scientist

From : Jerry L. McIntosh
AARD/IRRI Farming Systems Liaison Scientist

Subject : Monthly Report - December, 1984

I. Principal Activities and Accomplishments

A. Continued support to colleagues and Farming Systems Research

1. Upland Agriculture Research - Plans are proceeding to develop a transect of research sites in Sumatra, Kalimantan, Sulawesi and Java on red yellow podzolic soils (mostly Typic Tropudults). This is a collaborative effort between the Soils and Food Crops Research Centers. The work covers research on fertilizer efficiency in cropping systems, p x lime, p x varieties and varietal selection studies.

2. Upland Agriculture and Conservation project - Field work is underway drawing on the Indonesian counterpart funds. A more detailed plan of work is being developed.

3. Upland Rice Conference and Research - The planning for the Upland Rice Monitoring Tour and Conference to be held in Indonesia the last week of February and the first week of March is progressing. Some of the plots for research mentioned in the previous section (2) that is located in Lampung, South Sumatra and West Sumatra will be a part of the monitoring tour. Hopefully we can later include corn and soybean varietal testing in this research.

B. Preparation and editing of papers for Upland Rice Conference (Appendix).

C. Rework manuscript of publication on Farming Systems Research and Development in Indonesia.

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II. Miscellaneous Activities

A. Consultation and Visitors

Ian Hill - Investment Center, Rome, working on Upland Agriculture proposal for ADB.

Ms. Kresnawati Suryanata - University of Hawaii, Graduate Student studying Upland Farming Systems in Kalimantan.

Mr. Van Haderlee and Ir. Enka - Ministry of Forestry, Research issues in Watershed Management

Dr. Peter Dart - ACIAR, Developing BNF Project

ESCAP Review - Was able to attend only one day

Dr. R.L. Oldeman- IRRI, preparations for Upland Rice Conference

Dr. C.P. Mamaril- IRRI, INSFFER

Mr. F. Dauphin - ESCAP, strategies for soybean research.

B. Trips

1. Continuation of trip to Lampung from last month.

2. Trip with Messrs. Oldeman, Soetjipto and Tantera to look at research sites and develop itinerary for Monitoring Tour. The research plans and work are developing nicely. The problems with seed vigor and broad leaf weeds (borreria) are very obvious. It appears feasible to start the monitoring tour from the Branti Airport, visits the sites in Lampung and South Sumatra, and go on to West Sumatra by the Trans-Sumatra Highway.

III. Problems and Contrainsts

A. Hopefully funding for the Crop/Livestock Research project will be obtained from IDRC. This project will be very useful in developing strategies for interdisciplinary research as well as for technology.

IV. Plans

A. Support Upland Agriculture Research

1. Upland rice conference

2. Upland mixed farming systems research, such as, incorporated in the crop/livestock research.

3. Upland agriculture and conservation project.

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B. Help develop research master plans -specifically for Maros.

C. Edit and review papers for conferences.

JLM:fh

cc: Dr. B.H. Siwi
Dr. I.N. Oka
Mr. Carl Fritz

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Ecological Issues in Preproduction Testing and Production Programs Involving Upland Rice[1]

Jerry L. McIntosh[2]

Introduction

Upland rice is a key food commodity in upland mixed farming systems in most humid areas within the tropics. This does not mean that upland rice is the main crop in terms of food production or cash returns (Table 1). Upland rice however is a key crop in that it is a desired food commodity, provides good ground cover, and iswell adapted for growth during the rainy time of year. The straw makes good animal forage and bedding and may be used as a soil amendment through direct incorporation or as a mulch. But most of all upland rice is valued sociologically and a good crop brings satisfaction and a sense of well being. Consequently, it is important that upland rice production be stable and sustainable in the upland mixed farming systems. In this paper we will use our experiences from farming systems research and development in Indonesia as a basis for discussion of some of the social and economical as well as ecological issues relevant to the wide scale testing and implementation of national production programs involving upland rice.

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[1]Paper presented at the International Upland Rice Conference. Jakarta, Indonesia. March 4-8, 1985.

[2]AARD/IRRI Farming Systems Liaison Scientist. Collaborative AARD/IRRI Program in Indonesia. Agency for Agricultural Research and Development. Bogor, Indonesia.

General Strategy for Farming Systems Research and Development

Table 1 shows that other food crop commodities and agricultural enterprises each play a significant role in the small farm economy. Our past research has developed strategies for year around crop production. The systems developed are acceptable to farmers and are reasonably stable and sustainable in their entirely. There is a continuing need to improve soil fertility and conservation practices. But the stability of production of each crop or commodity in the system must be further improved. Recent cropping systems research has focused on these deficiencies in food crops production. Furthermore, it is the opinion of the Farming Systems Scientists working in these upland areas that in the long run the food crops component of the farm systems should be primarily for subsistence. Even under present conditions and constraints 0.5 hectare of land appears adequate to meet this need. Consequently, present and future farming systems research will be directed toward stabilizing production of the principal food crops within the patterns, improving soil fertility and conservation practices and increasing cash income through better utilization of land and labor resources. The animal and perennial crops components of the farming systems must be further developed.

Cropping Systems

Long term soil and crop management studies were begun in 1973 in Central Lampung in Sumatra. The studies were carried out in farmers' fields on land that had been cultivated for 20 years. The studies showed

that infertile and acid (about pH 4.3) soils (Tropudults), with moderate rates of fertilizer (70 kg N and 45 kg P_2O_5 per hectare for the rice crop) could produce 2 to 3 t/ha of rough rice. A year around cropping pattern was designed, based on existing farmers' patterns, and tested. This cropping pattern consisted of corn plus upland rice intercropped with rows of cassava spaced 2 meters apart. After harvest of the corn and rice a sequence of peanuts followed by rice bean (or cowpea) was interplanted between the rows of cassava (Figure 1). This pattern (C + ULR ≠ Cv ≠ Pnt - CP) was found to be much more productive and profitable (Table 2) than a random planting of the same crops as practiced by farmers as well as a sequence of upland rice followed by corn followed by rice bean (ULR - C - Rb).

This same general cropping pattern has been tested in experimental stations and farmers' fields in major upland agricultural areas of Indonesia and has been generally applicable. The first crops in the pattern, upland rice, corn and cassava, are almost always grown by upland farmers in some arrangement. Sometimes farmers grow legumes in this combination. In areas with short rainy seasons (< 4 months) farmers may not be able to plant and grow legumes after harvest of the corn and rice. This is a necessary adaptation of the cropping pattern not only for drier regions but also during drought years in the wetter regions. Even under these situations, the cassava will produce some yield and provide food subsistence.

Subsistence

Intuitively farmers develop strategies for food subsistence. This is particularly true in areas where upland rice is a major component of the farming systems. However, research on food self sufficiency, many times, is not a major objective in the view of researchers and policy makers for research institutions. But for farming systems researchers food self sufficiency is a very important aspect of the research if the research is truly farmer oriented. Consequently, the farming systems research, particularly in newly developed areas has developed strategies for the production of sufficient food to provide the basic food and economic needs of the families. Furthermore, because most new settlers are familiar with food crops production and production inputs are readily available this is a logical approach. Our research has concentrated on the development of cropping patterns and component technologies to provide stability and sustainability to these food production systems. We have identified certain components of the systems that are weak and need strengthening. There is a need for more research on soil fertility, fertilizer efficiency and soil conservation. But primarily there is a need to develop crop varieties that have yield stability. The present yield potentials are satisfactory but better varietal adaptation to cropping patterns and soil and climatic conditions are needed. We need better insect and disease resistance especially for upland rice.

The amount of land used for food crops depends upon yields and labor supply. From work in new transmigration areas in Indonesia 1/2 hectare has been found to supply enough food grain and legumes and

some surplus to sell. This food source is usually supplemented with vegetable, seed and fruit products from the home garden. In many instances small ruminants are included in the farm system. Table 1 gives some idea of the production and income that can be derived from these subsistence systems.

Labor becomes a constraining factor for increasing the land area under cultivation. For the subsistence system described, family labor can usually cultivate only about 0.7 hectare per year. Farmers are reluctant to hire labor or add extra power (draft animal or mechanical) because of the risk involved in food crops production. Usually alternative agricultural enterprises or off-farm work opportunities are sought to raise the family income.

Cash Economy

Many farmers in upland areas have between 2 and 3 hectares of land. Consequently, in these cases farmers have an opportunity to have food self sufficiency and, at the same time, additional income from other agricultural enterprises. For some farmers this may mean increasing the land area in upland rice and other food crops. The soil productivity and the availability of markets are important to farmers in determining the strategy for determining use of land, labor and capital. The potential for cassava production is great. The marketing constraints can usually be overcome through the planning and development of processing facilities. Soybeans can be successfully grown in many places and the long term market potential appears good. But in both these instances there are soil conservation and fertility constraints that affect the sustainability of production of those crops over time.

Perennial crops. Farmers spontaneously plant perennial crops. These may be planted to provide shade, fuel, fodder, seeds, fruit, exudates, spices and lumber. Most importantly, these crops increase production and economic stability of the farming systems. These plantings are usually random in terms of species as well as arrangement. Much research is needed to develop strategies for better use of the plants that farmers are now using.

For many of these perennial crops much information is available concerning varieties, cultural practices, unit production and price of products. This kind of information must be systematically collected, evaluated and models developed for the best adapted and economic species that could be grown and the relative proportions of each that could be most effectively included in a farming system. There will be some need for upland rice as a cover crop during early growth stages of these plantations. There will also be a need for periodic rejuvenation of these plantations by cutting and replanting. Consequently, within a farming system, food crops may be grown alone in a cropping pattern, in combination with perennial crops and as a cover crop for new and replantings of perennial crops.

Livestock. The range of livestock from fish and poultry to small and large ruminants offers many options for use of farm resources and increasing farm income. Farmers can quickly develop an enterprise that can convert low grade forage, fooder and crop residues into marketable high quality meat products. The larger ruminants offer additional value as sources of milk and power. Again the use of existing data to develop an ex-ante analysis of the economics of animal production would be

useful. We need to know the species and relative proportions of each species to include in a farm system. An approximation can be made by determining the labor and forage available within the farming system and the labor and feed requirements for each animal unit. This first approximation can be based on an "average" farm family and system and modified according to the existing situation. In any case, however, most farmers prefer some food crops for direct consumption. Stabilizing the yields of these crops in the farm biological, social and economic setting and complementing this production with perennial and annual crop enterprises is the key to the prosperity of upland agriculture.

Rural industry. The economy of upland agriculture is primarily dependent upon the successful production of agricultural commodities. But that production must be stable and marketable. There are some special circumstances in tropical upland agriculture that reduce production stability. The farms are usually small and rainfall dependent and have erosive and infertile soils. In combination these characteristics present research, extension and development challenges. These same problems, perhaps to different degrees, exist in most upland agricultural areas. With development, particularly development of infrastructure and improved communication and educational facilities, many of these problems can be solved in the context of rural development. The farm system must be developed but always in conjunction with the development of the area in general. In this context the farm systems provide labor as well as commodities for direct use and raw materials for processing and transport. Consequently, a stable upland farm system will likely include off farm labor as well as non agricultural but on farm labor opportunities.

Partitioning the Target Area

Initial national production programs involving lowland rice, such as Masagana 99 and BIMAS, were quite effective even though the recommendations tended to be general. Fortunately, the flooding and puddling of soils for lowland rice tends to mask major soil and climatic effects on rice production. With time and experience, however, recommendations have become more site specific for these kinds of programs.

For cropping systems involving upland rice, however, commodity specific recommendations with little regard for local biological and sociological conditions tend to be much less effective than for lowland rice. On the other hand, production programs cannot be developed and adapted for every field situation. Some rationale is needed to develop programs that can improve production and farmers acceptability in almost all situations and hopefully be well suited for many places. Further refinement and local adaptation can follow from field experience. But initially fitting of varieties and crop management to some natural soil and climatic conditions within the target area is desirable.

Categories and Cropping Patterns

Many classifications have been developed to characterize rice growing environments. IRRI scientists have reviewed these and have suggested a simple classification for use, principally for breeding purposes, for upland rice. These are:

- Favorable upland with long growing season (LF)
- Favorable upland with short growing season (SF)

- Unfavorable upland with long growing season (LU)
- Unfavorable upland with short growing season (SU)

Source: Terminology for Rice Growing Environments, IRRI, 1984.

This classification lacks specificity simply because it is intended to have worldwide application. It provides a basis for discussion and encourages further development of classification systems for specific situations. For developing countries socio-economic conditions have a definite bearing on development strategies and conditions, which in turn, determine the levels of intervention that can be part of national production programs.

For the purposes of this paper, we may use the classification system proposed by IRRI as a basis for partitioning of the upland rice growing areas of a country according to prevailing biological and climatical conditions. Prior to this, however, we feel an evaluation of the prevailing socio-economic conditions of the target area (in this case, the areas where upland rice is a part of the existing farming systems) must be made in order to determine the degree of intervention that is appropriate through production programs. Low and moderate input systems are discussed which are likely to be more appropriate for small, mixed farming systems that are common in the humid tropics of South and Southeast Asia. In all cases we are assuming that appropriate soil conservation practices will be followed.

Low input systems (LIS). Production programs and the associated technology packages many times are not accepted by farmers either because they have no money or have little desire to assume risk. Under these

conditions about the only new technologies that farmers can accept are new varieties and soil fertility management practices that involve green manuring and improved crop residue management.

Furthermore, local or improved local varieties of upland rice will likely be most appropriate. In all cases the upland rice will be simply one crop component of the whole upland cropping system and major efforts should be made to increase the cash income and stability through animal and perennial crops production. Whether the food crop patterns will be grown separately or in an interculture with perennial crops depends on the situation (landscape)

I. LIS - LF

Upland rice + corn - peanut or corn or greenbeans - cowpea soybean mungbean

II. LIS - SF

Upland rice + corn ≠ cassava or pigeon pea or sesame ≠ cowpea

III. LIS - LU

Upland rice + corn ≠ cassava ≠ peanut or soybean - cowpea or cover crop

IV. LIS - SU

Upland rice + corn ≠ cassava or pigeon pea or sesame ≠ cowpea or cover crop

---

+ means "planted with"
≠ means "intercropped with"
- means "followed by"

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These low input cropping patterns involving upland rice will need substantial amounts of animal or green manure to remain productive. We may use the model described in Tabel 1 to illustrate a procedure that may be followed where new lands are being opened or other situations where farmers have 2.0 - 3.0 hectares of land. The use of one hectare of land for an interculture of perennial crops and food crops could produce enough food for subsistence and products for cash sale. The perennial crop could be rubber, coconut, oil palm, spice crops or tree crops for fruit, fuel or lumber. The trees would be planted on the contour in rows but at one half population. The land area directly beneath the trees would be planted to a cover crop and the land between the rows of trees planted to one of the food crop patterns. The excess biomass from the cover crop may be used for animal feed or directly as green manure for the food crops. These kinds of systems can meet the needs of the farmer while meeting the requirement of being "environmentally benign". All low input production programs should contain these kinds of options and the appropriate support in terms of technology, seedlings and credit.

Moderate input systems (MIS). Most production programs include some recommendations for fertilizer and other production inputs. If upland rice yields are to increase above 2-3 tons per hectare inputs will be needed. But before this, stable, responsive and high yielding varieties must be developed. In the short run some modifications of existing local varieties could improve yield potential and stability while new improved varieties are being developed. But in the long run a series of varieties

with blast and brown plant hopper resistance, earlier maturity and higher yield potential will be needed if upland rice is to remain a major source of food production.

It is assumed that farmers, in areas where the infrastructure is reasonably well developed and where production programs exist, will make use of the programs. All of the precautions and efforts to increase cash income and improve the stability of the farming systems for low input systems apply here also. It is assumed however, that these farmers will be more inclined to assume risk and consequently will use more fertilizers, pesticides and other production inputs.

V. MIS - LF

Upland rice - peanut or soybean - cowpea

VI. MIS - SF

Upland rice - corn + cover crop

Upland rice + corn + pigeon pea or cassava or sesame

VII. MIS - LU

Upland rice + corn + cassava + soybean or peanut

VIII. MIS - SU

Upland rice + corn + pigeon pea or cassava

Upland rice + corn - peanut or cowpea

Over time, where inputs are available and used, the cropping patterns tend to become more uniform within any climatic or topographic group. The effects of the soil fertility factors are minimized and the patterns become stable. Also, where inputs are available, farmers may be committed to a higher proportion of food grain and vegetable crops and to grow these in stable food crop systems. Efforts must be made to stabilize the soil through terracing and perhaps developing land use patterns that involve more tree crops as in the case of the low input systems. In these cases there would likely be a higher percentage of speciality crops including tree crop species in multi story systems, vegetables and tobacco.

Preproduction Testing

Figure 2 shows the steps usually followed in carrying out a cropping/farming systems research program. The research is carried out as much as possible under farmers conditions so that the technology developed may be relevant not only to the target area in general but also to the specific conditions of the research site. After two or three years of component and systems studies, enough technology is usually generated to backstop multi locational trials that may be established to further test the technologies over a wider area. This testing may be carried out as a part of the systems research or it may be carried out by extension or by an intermediate organization. In Indonesia the Directorate of Food Crops Production conducts verification trials for all new technologies related to food crops production. This Directorate routinely carries out interdisciplinary cropping systems verification trials. Similar organizations do this for the other agricultural commodities. Consequently, there is a division of responsibilities based on commodities. This can make

integrated and interdisciplinary on site farming systems preproduction testing difficult to carry out. For future farming systems studies these kinds of activities will likely be carried out on a project by project basis.

In some cropping/farming systems research programs, pilot production projects are carried out as a further refinement and verification of the technology and identification of production problems. Finally these refined technologies may be incorporated into the national system (expanded) and implemented on a wide scale. All of this is contingent upon the availability of inputs (elite seeds, fertilizer and pesticides), financial credit and agricultural extension.

Technology Transfer

Efficient technology transfer within the government bureaucracy, for example, from research to extension, or from one site to others within country, region or throughout the world is very important. Funds, staff and time are limited and must be used more effectively. The suitability of the technology is dependent upon socio-economic as well as biological criteria. Simple but effective systems of characterizing the research sites and possible transfer locations are needed. In Indonesia we have used a simple format to characterize the soil and climatic environments of farming systems research sites. To this we have added additional information concerning institutions, timing, indexing phrases and an abstract of the research progress for

each of our farming systems research sites (Table 3) The usefulness of these descriptions is dependent upon the availability and use of long term climatic data and soil characterization through an internationally accepted system of classification, such as, Soil Taxonomy. The numbers of wet (> 200 mm) and dry months (< 100 mm) with some indication of distribution (bi modal, etc.), the latitude and elevation and the various kinds of information that may be derived from soil classification provide sufficient information to identify prospective target areas for technology transfer. On site research is still needed to verify or refine the technology. But the bases for technology transfer can be established and the length of time required for on site research can be reduced considerably.

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Table 1. Analysis of Upland Rainfed Farming Systems*

	Present situation w/o use of new tech.			Within 2 to 3 yrs implement and refine existing technology		Within 5 to 8 yrs develop and implement new technology	
	Price Rp/kg	Yield T/ha	Value Rp/ha	Yield T/ha	Value Rp/ha	Yield T/ha	Value Rp/ha
Food Crops Production							
Corn +	125	0.4	50,000	1.0	125,000	1.0	125,000
Upland rice +	150	0.8	120,000	1.5	225,000	2.5	375,000
Cassava +	10	1.0	70,000	7.0	70,000	10.0	100,000
Peanut (pod) -	400	0.4	160,000	1.0	400,000	2.0	800,000
Cowpea	200	0.2	40,000	0.4	80,000	0.6	120,000
Total for 1 ha			440,000		900,000		1,520,000
Total for ½ ha			220,000		450,000		760,000
Animal Production							
Small ruminant (5 adults)	40,000/ animal	-	-	6	240,000	10 units	400,000
Poultry (10)	-	-	-	-	food	-	food
					240,000		400,000
Perennial Crops**							
Rubber (1.5 ha)	800	-	-	0.6	480,000	10	800,000
					720,000		1,200,000
Total gross income (2.0 ha)			220,000		1,410,000		2,360,000

*Two hectares farm on infertile red-yellow podzolic soils.

**Credit needed for establishment. Production figures given are for years 5 and 8, respectively.

Source: Upland Rice Research Project Proposal, AARD/IRRI.

Table 2. Average yield of crops and approximate net returns for check and full treatment plots. Cropping Systems Research, Bandarjaya, Central Lampung, 1973-74[a].

Fertility treatment	Dry grain (kg/ha)				Cassava fresh root (t/ha)	Approximate net return (Rp/ha[b])
	Corn	Upland rice	Peanut	Rice bean		
			(A) Mixed Cropping			
No lime + no NPK + no mulch	467	690	161	55	12.7	65,000
Lime + NPK + mulch	1,165	1,358	356	248	28.3	132,000
			(B) Intercropping			
No lime + no NPK + no mulch	455	769	222	93	14.6	91,000
Lime + N K + mulch	1,350	2,724	567	627	23.2	265,000
			(C) Sequential Planting			
No lime + no NPK + no mulch	606	850	-	153	-	(-6,000)
Lime + NPK + mulch	2,935	3,536	-	723	-	74,000

[a]Yields subsequently have varied due to pests and management but have remained basically the same.

[b]U.S. $1.00 = ca. Rp. 415

Source: McIntosh and Effendi

Table 3. Sample Research Brief . Cropping/farming systems research sites that have been completed and those that are on-going, AARD.

Site location	Edaphic condition	No. Months with Rainfall >200 mm and <100 mm		Most probable Soil classification or type	Latitude: Elevation:	Year Started	Year Stopped	Institution
Bandar Agung and Komering Putih, Central Lampung, Sumatra	Rainfed upland	5	2	Typic Tropudult, clayey, mixed isohyperthermic	4° 40'S ± 40 M	1975	1978	CRIIC

Descriptive phrases: Cropping systems, interdisciplinary, integrated and on-farm research; food crops and economic component studies.

These sites are similar in many respects but were intended to represent "old opened" and "newly opened" land, respectively. Newly opened land in the Target Area is mainly settled by transmigrants from Java while the "old opened" areas are settled by indigenous people. It was found tot feasible to work with both groups at the same time due to differences in cultures as well as farming systems. Both sites selected were settled by transmigrants but Bandar Agung had been opened for about three years while Komering Putih was being newly opened.

Research followed the strategy developed in Indonesia and modified by contacts through the Asian Cropping Systems Working Group. Surveys were conducted in the Target and adjacent area to develop an agro-economic profile. Year around cropping patterns based on the Farmers Cropping Pattern (FCP), Farmers Cropping Pattern w/o Constraints (FCP, w/o C), and Introduced Cropping Pattern (ICP), were tested in farmers' fields. Ancillary component technology studies were conducted on weed control, soil fertility, varietal testing, entomology and farm record keeping. The basic cropping pattern developed in Bandarjaya was found to be acceptable to these areas with some options for flexibility in populations of crop species in the basic pattern of corn plus upland rice intercropped with cassava (after 30 days) and then peanuts followed by cowpea planted between the rows of cassava after harvest of the corn and rice. This pattern is illustrated by C + ULR / Cv / PNT - CP.

The crop yields and net returns were consistent with data from previous trials. Some management techniques and "rules of thumb" for management began to be apparent. These were:

a. Imperata is not a problem after initial land opening if the food crops are grown in year around cropping patterns and grow vigorously (receive fertilizer).

..... cont.

Table 3. continued

b. Shoot fly (corn), seedling fly (upland rice) and agromyza (legumes) are very serious pests and must be controlled. The best control measure was found to be carbo furadan applied with seed.

c. The soils require phosphorus fertilizer. This is most effectively applied in row with seed.

d. Neck blast on rice is a major problem. Local varieties less affected. Rates of nitrogen should not exceed 60 kg/ha on susceptible varieties.

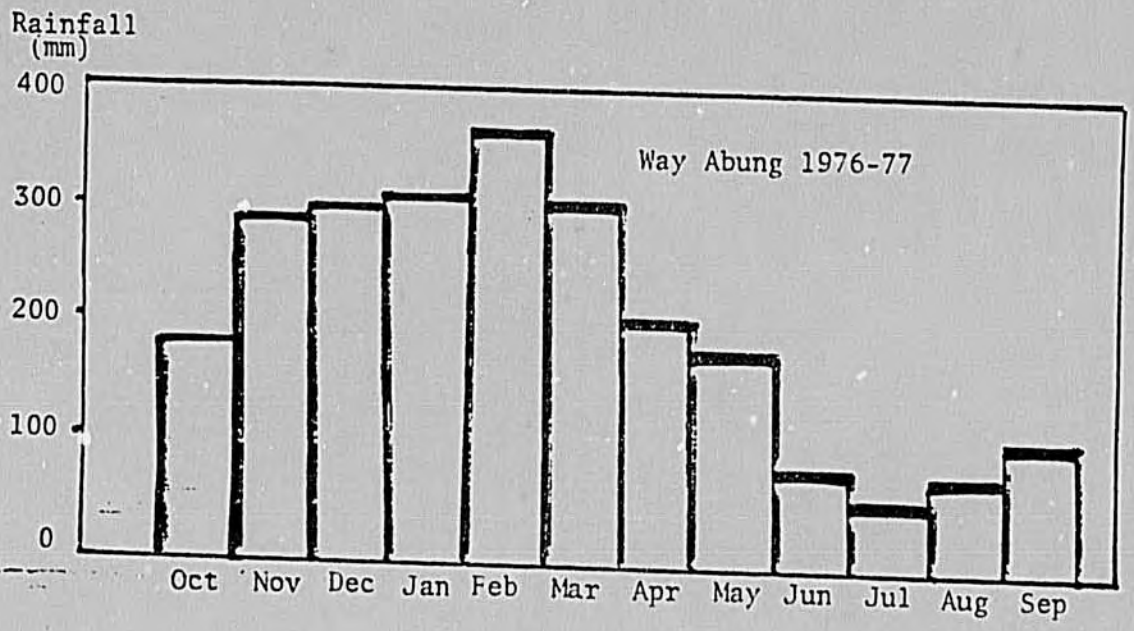
e. Must use DRM varieties of corn.

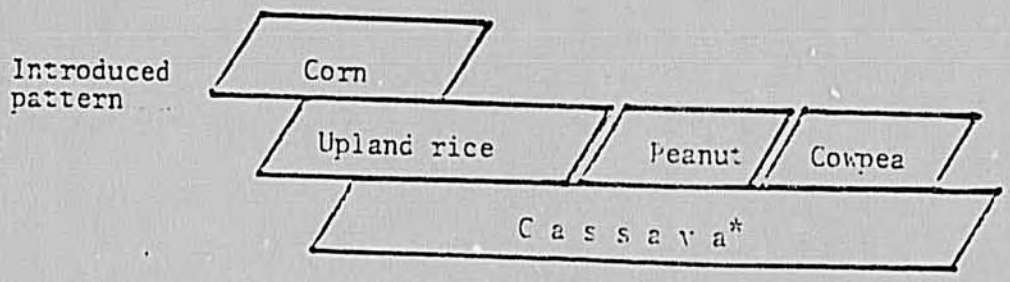
f. Farmer and family have difficulty cultivating more than 0.5 ha of land when first opened and 0.7 ha later.

g. Cassava grows well but difficult to market. Population of cassava in pattern must be synchronized to marketing situation.

h. Not difficult to produce yields and gross returns (present prices) as follows:

	Farmers' pattern			Introduced pattern	
	Price Rp/kg	Yield T/ha	Value Rp/ha	Yield T/ha	Value Rp/ha
Cropping pattern					
Corn +	125	0.4	50,000	1.0	125,000
Upland rice /	150	0.8	120,000	1.5	225,000
Cassava /	10	7.0	70,000	7.0	70,000
Peanut (pod) -	400			1.0	400,000
Cowpea	200			0.4	80,000
Total for 1 ha			240,000		900,000
Total for 1/2 ha			120,000		450,000





*Population dependent upon market potential

Fig. 1. Monthly rainfall distribution and year around cropping pattern commonly tested on Red-Yellow Podzolic soils.

Source: McIntosh, Ismail, Effendi and Sudjadi

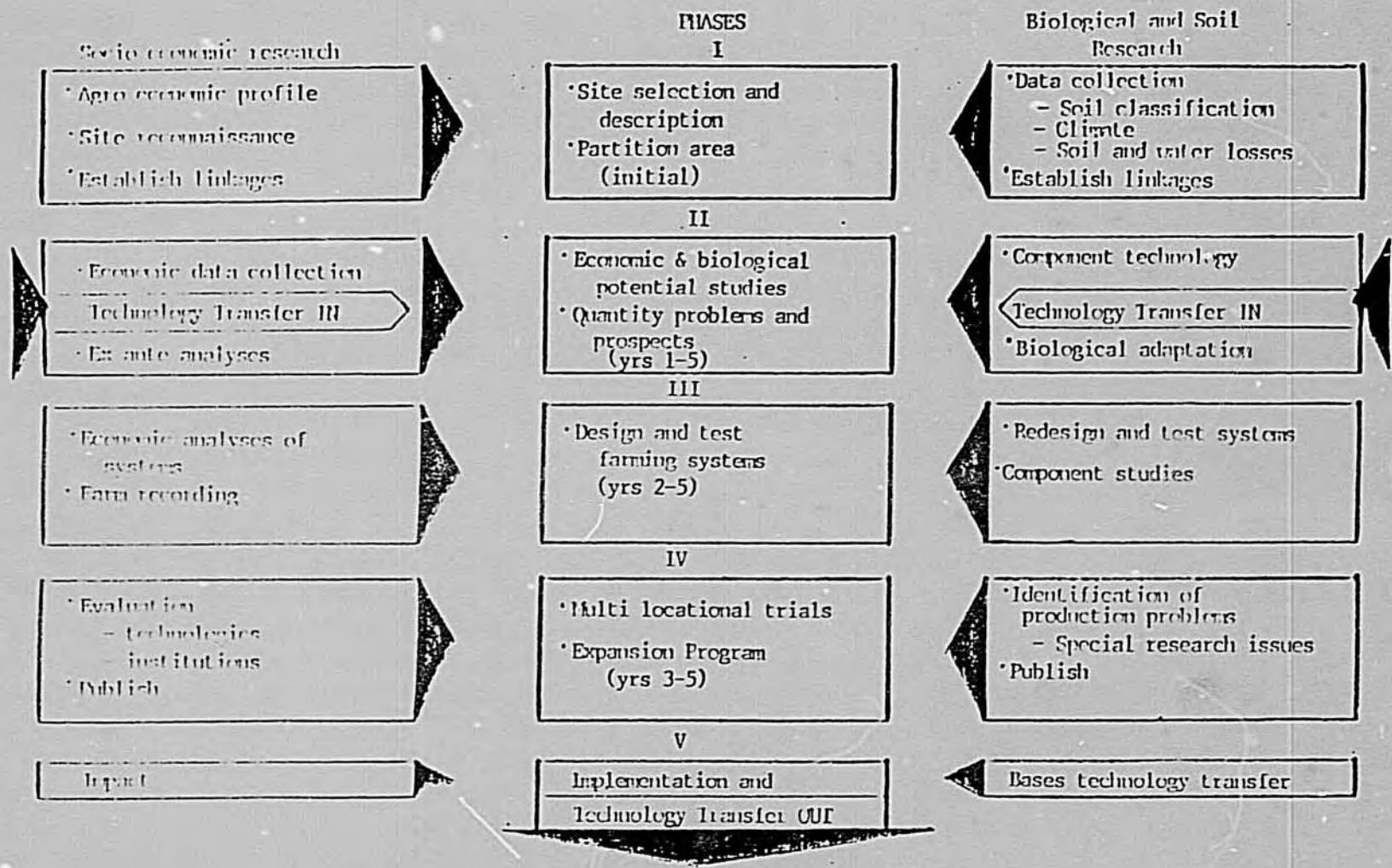


Figure 2. Parallel biological and socio-economic activities required for the five distinct research and implementation phases of a Farming Systems program with little inflow of technology.

QUARTERLY REPORT

OCTOBER - DECEMBER 1984

POSTHARVEST TUBER CROPS SPECIALIST

DIANE M. BARRETT

Most of the October - December quarter was spent in the implementation of the "Postharvest Evaluation of Tuber and Fruit Crops" for AARD. A synopsis of activities which took place in connection to this evaluation appears under the "Organizational" section of this report.

A. Organizational

1. Carried out "Postharvest Evaluation of Tuber and Fruit Crops" for AARD, in conjuction with 2 other non-AARD consultants, Prof. Dr. Gunawan Satari (UNPAD) and Prof. Dr. Soewarno T. Soekarto (IPB). This project was funded through AARP short-term training funds and consisted of the following activities :

   a. Governmental Department meetings

      1. Department of Agriculture

      2. Department of Industry

      3. Department of Trade

   b. Dinas Pertanian and Dinas Perindustrian meetings, in Malang, Yogyakarta, Padang, Aceh, Medan, Bogor and Lampung

   c. Research Institute Visits

      1. Balai Besar Industri Hasil Pertanian (Dept. Industry)

      2. Lembaga Kimia Nasional (LIPI)

      3. Lembaga Biologi Nasional (LiPI)

      4. BULOG

      5. Pusat Pengendalian Mutu Barang (Dept. Trade)

6. Balai Pengembangan dan Penkajian Teknologi (Min. of Science and Technology)

7. AARD institutes

a) CRIFC

b) CRIH

c) BORIF

d) MARIF

e) LERIF

f) SURIF

g) SARIF

h) Sub-Research Institute, Karawang

i) Sub-Research Institute, Brastagi

d. Universities

1. IPB

2. UGM

3. UNIBRAW

4. ITB

5. UNANDALAS

6. UNSYIAH

e. Industries

1. tapioca - Bogor, Sitiung, Lampung

2. citric acid - Lampung

3. tapioca, fermented products - Malang

4. alcohol - Lampung

5. fruit slices - Jakarta, Malang

6. fruit juice - Jakarta

7. fruit seed propagation - Semarang

8. markisah juice - Medan (Brastagi)

f. Farmer and trader interviews

Malang, Yogyakarta, Lembang, Bogor, Aceh, Medan, Padang

2. Wrote terms of references for various SURIF research projects, i.e. :

   a. pigeon pea utilization

   b. cassava by product utilization

   c. yellowing of grain

   d. threshing and drying of legumes

3. Prepared proposals for cassava postharvest research products for 1985/86, i.e. :

   a. varietal classification - as to chemical and physical characteristics

   b. improved storage of "gaplek" (dried cassava)

   c. storage of fresh cassava

   d. utilization of cassava by-products

4. Formulated budget for 1985/86 cassava postharvest research

5. Wrote a terms of reference for a short-term consultant on chemical laboratory equipment, submitted to the NAR II project.

B. Training

1. Trained technicians in leaf sample praparation and drying techniques

2. Discussed available starch and sugar analysis techniques, began a comparison of time requirement, cost and ease of analysis

3. Perfected fiber analysis methodology

C. Research

1. Began storage of fresh cassava experiment - October 4

2. Followed (every 10 days) analysis of physical changes in cassava stored in moist rice husks. Prepared samples for chemical analysis and initiated chemical analysis.

3. Began sweet potato leaf analysis experiment - October 2 . Assisted in chemical analysis

4. Carried out a comparison of 4 methods of starch and sugar analysis

5. Discussed methods of HCN and aflatoxin analysis with colleagues from the Center for Animal Disease Research in Bogor. Arranged for training of one SURIF staff in the thin layer chromatography method for aflatoxin analysis.

6. Calculated time and manpower requirements for all routine analysis in the chemistry lab at SURIF. Following these calculations, laid out a procedure for scheduling of analysis and manpower on a month-to-month basis. Discussed these suggestions with colleagues at SURIF.

7. Initiated a permanent listing of chemicals or glassware needs to be updated periodically by lab staff.

8. Reviewed use of the polarimeter for sugar analysis.

D. Miscellaneous

1. Met with the Deputy Attache of the Swiss Embassy several times to discuss a rice marketing project in Lombok.

2. Attended a seminar on research management in Sukamandi, November 6.

3. Assisted in short-term training plans for SURIF staff.

DMB:is

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SUMMARY OF ACCOMPLISHMENTS

AND FUTURE PLAN

CHHORN LIM

FISH NUTRITIONIST

I began working with the Research Institute for Inland Fisheries at Bogor on May 20, 1983 as a Fish Nutritionist. The major tasks assigned to me as has been suggested by the Director of the Institute were to :

- Advise and assist the researchers in Nutrition and Feed Technology in designing and conducting the experiments
- Conduct the experiments in collaboration with the staff
- Extend to the staff the knowledge in nutrition, feed technology, feeding and related subjects through demonstration, lectures and seminars
- Assist the Institute in preparing the research programs and project/research proposals
- Assist the Institute in the identification and procurement of equipment and facilities needed for researches
- Perform other functions from time to time when the needs arise.

This report describes briefly the accomplishments for the 20-month period (May 20, 1983 to January 20, 1985) and the plan for the future activities with projected accomplishments.

1. ACCOMPLISHMENTS

1.1. Research

The goals of the Nutrition and Feed Technology Division

at Bogor are to develop economically suitable feeds and feeding standard for common carp and other important species. However, most of the studies conducted were either duplicating or repeating the works which have been done due to unawareness of the researchers on the available information. The existing problems were not identified and the collaborative efforts among the staff within the same Division were poor. The experiments were not properly designed, and the diets were poorly formulated and prepared. The vitamin and mineral mixes used were those available in the market for poultry. The essential equipments required in feed preparation such as mixer was not available. In most cases the experiment failed or the results were unconclusive.

At present, these problems have been solved. The staff were taught the importance of the formulation of experimental diets, information and criteria needed in feed formulation and the various steps in feed processing. The necessary equipments have been acquired. The proper experimental designs, and data collection and recording were introduced. The vitamin mix and mineral mix formulae for various species cultured under various systems have developed and used successfully. As a result, the experiments were successful and information generated were conclusive.

Surveys to various running water common carp farms in Java were conducted to determine the status and problems

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related to feed and feeding. Different feed manufactures were also visited to evaluate the status of the existing technology in fish feeds and their related problems. These informations have been used as a guide in formulating long-term and short-term research programs of the Institute.

At Depok Substation, the major problems faced by some researchers were poor growth and survival of the larvae cultured under laboratory conditions. Most often the research results were not conclusive. It was identified that these problems were mainly due to poorly designed culture systems which resulted in poor water quality, and improper feeding practices. The giant gouramy larvae cultured for four weeks at the laboratory grew only from 10 mg to a maximum of 100 mg. The survival rate obtained range from 20 to 50%.

A simple water recirculating system for larval rearing of giant gouramy was introduced. The feeding rate and feeding frequency were increased. A great improvement in the growth and survival was achieved. For four week culture period the survival rate obtained was always more than 90%. The fish grew from 10 mg to more than 300 mg. These data have been consistently maintained up to the present in various research studies.

Advice, assistance and recommendations were also given to the staff members whose research activities were indirectly or directly involved in nutrition, feeds and feeding.

In addition to the above mentioned accomplishments, several experiments were conducted in collaboration with the Institute staff. The following describes the titles and the status of the research studies :

a. Effect of feeding regimes on gonadal development of milkfish (completed)

b. Milkfish maturation using different sizes and shapes of tanks (completed)

c. Palatability of various diets for bull frogs (completed)

d. Effect of dietary levels of lipid on the maturation, fecundity and egg hatching rate of common carp (completed)

e. Growth and survival of giant gouramy larvae fed various combinations of an artificial diet and Moina sp. (completed)

f. Effect of feeding rates on the growth and survival of giant gouramy larvae (completed)

g. Effect of feeding rates on the production of common carp in running water ponds (completed)

h. Evaluation of commercial feeds for common carp cultured in running water ponds (on-going)

i. Determination of optimum carbohydrate to lipid ratio for common carp diets (on-going).

j. Effect of feeding methods on the production of common carp in running water ponds (on-going)

1.2. Development

A few commercial feeds were available for common carp cultured in running water ponds. They were formulated by persons who do not have sufficient knowledge in nutrition and feed development. The quality of feeds was generally poor and a feed conversion of 3 to 3.5 was reported for some feeds.

Efforts were made to examine the formulae and reformulated the feed based on the existing available nutritional information. A significantly better feed formula has been developed. The feed conversion was considerably improved from 3.5 to 2.4 without any substantial increased in feed cost. This formulae has been adapted and presently used by some feed manufactures in the country. Recommendations were also made to different feed mills on the used of antioxidant and antimold in fish feed. The proper methods of feed packaging and handling were also suggested. As a result, a plastic lining has been added to the feed package. The incidence of the growth of mold has been minimized and the shelflive of the feed has been extended.

At present another feed formulae for common carp have been developed. This feed has been tested against the existing commercial feeds. The feed conversion ranges from 1.9 to 2.0 as compared to 2.4-2.6 for the

rcial feeds The cost of the new formulae is

slightly higher. However, economic analysis shows that the new formula is the most economical.

A feed formulae for the maturation of milkfish has also been developed and evaluated. This feed has been used successfully for maturing milkfish cultured in tanks at the Brackishwater Aquaculture Development Center at Japara. The cost of this feed is high and further testings are needed to bring down the price.

The diet for early larval stage of fish was also developed and tested against the natural food. The survival rate was comparable to that of the natural food for the giant gouramy larvae but was significantly lower for the larvae of common carp and Clarias. However, the growth of fish fed the artificial feed was always lower than that obtained with natural food. Thus, improvement in the nutritive values and physical properties of the feeds need to be done before successful larval feed could be developed.

The vitamin mix and mineral mix formulae for various species cultured under various conditions have been developed. These have been successfully used in commercial fish production and various experimental runs.

The artificial diets for different stages of Penaeus monodon were formulated. These are being used and/or evaluated at the Sub-BPPD, Kamal.

A comprehensive short, medium and long term research program for the Nutrition and Feed Development have been developed. The research activities for the fiscal year 1984/85 and 1985/86 have been prepared based on the problems areas identified. An assistance was also given in the preparation of the five year research program for the Gondol station. The list of equipment for Gondol were studied and revised.

1.3. Demonstration, lectures and seminars

Several demonstrations were done to the staff whose research activities are related to nutrition, feeds and feeding. These include preparation of feed ingredients, detection of the quality of the ingredients, feed formulation and processing, vitamin and mineral mix preparation and the various methods used in determining the feed quality. The proper ways in fish handling and sampling were also taught.

A total of 32 lectures/seminar equivalent to 74 hours were offered to the Institute staff, demonstration and extension workersand private sectors. The topic discussed were on various aspects of nutrition, feeds,feeding and aquaculture.

1.4..Publications

Two publications (Recommendation on the quality control of fish feed and Problems in shrimps feed and feeding) have been prepared. Several more publications

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resulting from the various experiments are in the process of being prepared.

2. FUTURE PLAN (February 1, 1985 to April 30, 1986)

During this period, advice and assistance will be given to the staff in designing and conducting the experiments. The problems in feeds and feeding faced by fish farmers and feed industry will be reexamined. The problems identified will be prioritized and used as basis in developing the research activities. Assistance will also be provided to the Institute in formulating the research programs and preparing the project/research proposals for external funding. The experiments will be conducted in collaboration with the staff of the Institute. The research areas to be tackled varies for different species. For common carp, efforts will be given in the improvement of the existing feed formulae to a feed conversion of 1.7 to 1.8. Substitution of the imported feed materials with locally available feedstuffs will done to reduce the feed cost. Development of the feeding standard will also be conducted. For P monodon , studies will be concentrated on feed formulation and testing againist commercial feeds. Feeding practices will also be developed. Experiments on milkfish maturation will be continued at Gondol in collaboration with Dr. Vanstone and the Institute personnel. Larval feeds will also be developed and tested.

By the end of this period, a manual on common carp nutrition, feeds and feeding will be prepared. The commercially acceptable diets for intensive culture of P. Monodon shall have been evolved. Suitable feeds for early larval stage of fish shall also have been developed. The research data generated from various experiments will be written and published.

Demonstration and training will be done whenever necessary. Lectures/seminars in nutrition, feeds, feeding, aquaculture and related subjects will be continued. Consultation trips to various Sub-Balai will also be done.

QUARTERLY ACTIVITY REPORT

OCTOBER TO DECEMBER, 1984

CHHORN LIM

1. PRINCIPAL ACTIVITIES

1.1. Research related activities

1.1.1. Conducted two experiments on milkfish maturation at the Brackishwater Aquaculture Development Center(BADC), Japara

1.1.2. Assisted the Nutrition and Feed Technology Subdivision in formulating the research activities for 1985/86.

1.1.3. Assisted the Institute in formulating the 5-year research program for the Sub-BPPD, Gondol.

1.1.4. Formulated several diets :

- Least-cost practical diet for common carp cultured in running water ponds.
- Practical diets for various stages of P. Monodon
- Experimental diets to contain various carbohydrate to lipid ratios
- Experimental diets containing graded levels of supplemental cholesterol

1.1.5. Made arrangements with P.T. Sinta Prima Feedmill for the processing of the least-cost practical diet needed for the experiments.

1.1.6. Requested P.T. Sinta for 600 kg of feed (free-of-charge) for used in the experiment on the feeding methods.

1.1.7. Assisted Mrs. Ningrum and Mr. Hidayat in conducting the following experiment :

- Effect of feeding rates on the production of common carp in running water ponds. (Mrs. Ningrum)
- Carbohydrate to lipid ratiosin common carp diets (Mrs. Ningrum)
- Effect of feeding frequency on feed consumption by common carp fingerlings (Mrs. Ningrum). This experiment was terminated after two weeks due to unforseen problems.
- Effect of caudal fin cutting on the growth and survival of common carp (Mr. Ongko and Mrs. Ningrum). This experiment was terminated after 4 weeks due to insufficient water flow which caused mortality in some tanks.
- Evaluation of commercial feeds for common carp cultured in running water ponds (Mr. Hidayat)

1.2. Lectures/Seminars

Offered two seminars (2 hours each) at BADC, Japara. The topics discussed were the chemical and physical quality of shrimp feeds and nutrient requirements of shrimps.

1.3. Travels

1.3.1. Trip to Sumedang on October 1 - 2 (Appendix I.F1)

1.3.2. Trip to BADC, Japara on October 10-12 and November 12-15 (Appendix I.F2)

1.3.3. Trip to Sub-BPPD Depok, on November 20, 30 at December 15 (Appendix I.F3)

1.3.4. Trip to Cidahu and Cisaat. Six trips were made during this quarter to sample the experimental fish and check the progress and problems encountered.

2. MISCELLANEOUS ACTIVITIES

2.1. Consultated by the staff

2.2. Consultated by private feed manufactures

2.3. Attended several meetings and seminars

2.4. Attended to the institute guests/visitors

3. PLAN FOR NEXT QUARTER

3.1. Conduct two experiments on milkfish maturation at Sub-BPPD, Gondol with Dr. Vanstone, Mr. Alie and Mr. Tadjuddin.

3.2. Conduct experiments in nutrition and feeding of common carp in collaboration with BPPD staff

3.3. Assist the Institute in various activities on shrimp feeds and feeding.

3.4. Trip to various Sub-BPPD, private fish farms and feed manufacturers.

3.5. Offer lecture /seminar and consultation.

TRIP REPORT

TRIP TO SUMEDANG, WEST JAVA

CHHORN LIM

This trip was made with Mr. Atmadja and Mrs. Ningrum from October 1 to 2 to observe the Pangasius fish farm and other aquaculture activities in the area.

The Pangasius farm is owned by Mr. Suhana. The operation was started in 1980. There are a total of 8 ponds of different sizes with a total area of about 2 ha. During the time of this visit the owner was not present and the interview was done with an extension officer who is detailed at the farm.

The fingerlings used were purchased from an agent in Jakarta who imported the fish from Thailand through Singapore. The size ranged from 8 to 10 cm. They were first stocked in nursery pond at a rate of 100,000 per 1,123 m^2 for 2 to 4 months until the fish reached 50-100 g in size. They were fed, 3 times per day (0800, 1200 and 1500 hours) with a moist feed prepared at the farm. The quantity of the feed given was not based on the percentage of the biomass but estimated based on the actual consumption. The daily amounts of feed fed (wet weight basis) were 40, 60 and 80 kg for the 1st, 2nd and 3rd month, respectively. The survival rate varied from 70 to 80%.

Prior to stocking, the ponds were drained completely and allowed to dry for one week. Lime was applied at a rate of 3 tons/ha and urea at 500 - 600 kg/ha. If a lot of organic matters were

found on the pond bottom, the mud is partially removed using manual labor.

The home made feed composes mainly of rice bran, bread crumb, and unfertilized chicken eggs and dead chicks. Sometimes, hotel wastes and seed oil cake were used. The proportion of various ingredients were : $\frac{1}{3}$ rice bran, $\frac{1}{3}$ bread crumb and $\frac{1}{3}$ of unfertilized eggs. The unfertilized eggs and dead chicks which were obtained free-of-charge were cooked and kept in concrete basin for 2 days before use.

About 40 kg of feed was made for each batch. The rice bran and bread crumb were cooked in pre-boiled water and stirred. The boiled unfertilized eggs were then added and the whole batch was again stirred to mix. An unspecified additive was also added at 25 g/40 kg of feed.

The fish which has been grown in the nursery pond to 50-100 g were transfered to the grow-out pond. Initially they were stock at 20,000 fish/5,300 m^2 and cultured for 8 to 12 months. After 8 months of culture period, partial harvest was done 3 times/week. About 200 kg of fish was collected during each harvest. When about half of the number of fish stocked has been harvested, the pond was drained and the ramaining fish were used for restocking. Smaller size fish (50-100 g) were also added at a rate of 20,000 to 100,000. Continuous harvests were done as previously mentioned.

The pond preparation was the same as that described for nursery pond. The feed used was the same as that for nursery. At the beginning of the culture period, 100 kg of feed was fed per day. The amount of feed was then increased monthly based on the amount they can consume. Fish were fed from a plateform 3 times daily. The production obtained was not revealed but the survival rate was high (about 95%).

During this trip, observations were also made to other fish farms which are parts of the community farming systems. These composed of running water culture of common carp, rice-fish culture (seed production) and poultry-fish.

TRIP REPORT

TRIP TO BADC, JAPARA

CHHORN LIM

Two trips were made to the BADC, Japara. The first trip which was on October 9 to 11 was to check the progress and problems of the experiments and transfer the canvas tank and milkfish. The second trip (November 12 to 15) was to sample the fish and transfer some fish to Gondol.

October 9 to 11

The experiments progress very well although there were some difficulties in procuring the fresh trash fish. The pellet was processed with the California Pellet Mill instead of meat grinder. However, mixing was the problem due to the break down of the Hobart Mixer. Suggestions were made to Mr. Busman to repair the mixer soonest.

Due to the need of space for extension of the wet Laboratory, tank C (canvas tank) was moved to another location. The fish were transfered individually to a concrete nursery tank while canvas tank was being installed. Upon my arrival, the tank had been set up and the fish were to be transfered back to the canvas tank the next morning. To avoid sudden change of the physico-chemical parameter, I suggested to Mrs. Anin to construct the roof over the tank using bamboo mat covered with plastic. Thus, the transfer of the fish was delayed until the construction is completed.

The discussion was also made with Mr. Made and Mrs. Anin about the trial of transporting milkfish broodstock from Japara to Gondol. They were also informed about the arrival of Dr. Vanstone in Japara on October 11 or 12 to further discuss about the milkfish transport. I also requested Mrs. Anin to check whether or not milkfish which were previously escape from the ponds are still in the water supply canal.

A seminar on shrimp feed and feeding was given in the afternoon of October 10. It lasted for 1 hour and 45 minutes

November 12 to 15

No major problems were encountered for both experiments. However, we were informed that the center will need all the concrete tanks by the end of November. Thus, we decided that the experimental fish will be transported to Gondol according to the following schedule : November 13, 17, 21, 25 and 29.

Sampling of the experimental fish was done on November 13 with Dr. Vanstone, Mr. Tadjuddin and the BADC technicians. Five fish from each of the tank A, B and C and 6 fish from tank D were sampled. They were individually measured for lengths and weights. Two fish from each tank were sacrified and dissected. The sex was determined, the gonads weighed and preserved in Bouin's solution. The data are presented in Table 1.

The condition factors of fish fed artificial diet plus trash fish (Tank A) and artificial feed alone (Tank B) were nearly the same. In both tanks the fish were maturing.

Table 1. Length, weight, condition factor, sex, gonad weight and gonado-somatic index of milkfish broodstock sampled on November 13,.1984.

Tank	Sample No.	Length (cm) SL	FL	TL	Wt (g)	Condition Factor	Sex	Gonad Wt (g)	GSI	Remarks
A	1	51.2	54.1	66.5	2700	0.92				
	2	50.4	53.0	65.3	2930	1.05				
	3	56.2	58.5	75.0	3960	0.94				
	4[c]	55.4	58.0	72.4	3680	0.97	M	12.49	0.34	Running milt.
	5[c]	53.0	56.5	69.5	3100	0.92	M	36.00	1.16	Running milt.
						Av. 0.96				
B	1	56.0	58.0	71.0	3300	0.92				
	2[c]	58.0	62.0	77.0	4600	1.00	M	12.40	0.27	Running milt.
	3	58.5	60.6	77.5	3900	0.84				
	4[c]	54,7	56.8	71.8	3600	0.97	F	36.0	1.00	Well developed Granulated ovary
	5	55.5	50.5	71.7	3770	1.02				
						Av. 0.95				
C	1[c]	59.5	61.0	71.0	3640	1.02	F	28.29	0.78	Not well developed or regressed
	2	60.2	64.0	80.5	4520	0.87				
	3	55.3	57.0	73.0	3900	1.00				
	4	62.4	64.5	80.0	4650	0.91				
	5[c]	59.0	61.5	73.7	4470	1.12	F	182.20	4.08	Well developed Granulated ovary
	6[d]	63.0	64.0	79.0	4270	0.87	F	72.50	1.70	Granulate ovary
						Av. 0.97				
D	1	53.3	55.5	69.0	3270	1.00				
	2	48,7	51.7	65.0	2500	0.91				
	3	45.3	49.7	62.0	2150	0.90				
	4	48.60	50.7	65.0	2340	0.85				
	5[c]	52.2	54.0	69.0	2900	0.88	F	116.00	4.00	Yellowish and well developed
	6[c]	49.0	51.0	63.5	2500	0.89	F	10.00	0.40	Granulate ovary
						Av. 0.92				

(a) $C = \frac{W(g)}{TL^3 (cm)} \times 10^2$; (b) $GSI = \frac{GW (g)}{W(g)} \times 10^2$

(c) Sacrified; ; (d) Died on November 14.

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Both fish in tank A had running milt while those of tank B had running milt and well developed granulated ovary with bright yellow in color. These results show that supplementation of trash fish in the ration of milkfish is not necessary provided that the artificial diet is nutritionally complete.

The broodstock in tank D (200 m^2) had slighly lower condition factor than fish in tank B (40 m^2) and C (7.5 m diameter canvas tank). This could be due to larger size tank which permited more active swimming. All the fish from various tanks had either mature gonads for male or developing gonads for female. The gonado-somatic indexes ranges from 0.40 to 4.08 for female and was 0.27 for male. Thus, the tank size and shape did not have any effect on milkfish maturation but could affect the condition factor of fish and consequenly delay the on-set of maturation.

The summary of the physico-chemical parameters of water in various tanks are given in Table 2.

A seminar on the nutrient requirements of shrimp was offered on November 14 at 1900 hours. It lasted for 2 hours and 15 minutes and attended by about 60 people.

Table 2. Ranges and averages of water physico-chemical parameter in different experimental tanks for period September 10 to October 30, 1984

Tank	Temperature (°C)*		Dissolved Oxygen(p.p.m)*		Salinity (p.p.t.)
	AM	PM	AM	PM	
A	28.0-30.0 (28.4)	28.0-30.0 (29.7)	3.65-7.61 (5.05)	4.51-9.58 (6.15)	30.0 - 32.0 (30.9)
B	28.0-30.0 (28.8)	28.0-31.0 (29.4)	4.02-10.47 (5.18)	4.28-8.34 (6.29)	30.0 - 32.0 (30.9)
C	27.0-30.0 (28.0)	27.0-31.0 (28.2)	4.02-10.47 (5.59)	4.28-8.34 (6.05)	30.0 - 32.0 (30.8)
	28.0-32.0 (28.9)	28.0-32.0 (29.4)	4.60-8.75 (6.51)	5.03-9.84 (7.65)	30.0 - 32.0 (31.0)

*Numbers in parentheses represent the averages.

TRIP REPORT

TRIP TO SUB BPPD, DEPOK

CHHORN LIM

Three trips were made to Sub BPPD, Depok for the purpose of consultation by the research staff.

1. November 20

Over 3 hours of discussion was made with the staff on :

- Morphological development of giant gouramy larvae and other research problems related to larval rearing
- Frog feed and feeding especially for tadpoles
- The schedule for my future consultation trip. It was agreed on every saturday.

2. November 30

During this trip, the discussion was made only with Mrs. Noveny on the progress and problems of her field testing experiment with the private farmer in Bekasi. Assistance was also given on the interpretation of the data on feeding rate of giant gouramy larvae. The other activity was to serve as resource person in fish feed and feeding during the visit of the Junior Minister for Fisheries and Livestocks.

3. December 15

The consultation was on :

- The proximate nutrient composition of commercial feeds and the limitations of the data in relation to the

actual nutritive values of feeds.

- The nutrient content of natural food organisms
- Interpretation of the experimental data of Mrs. Haniah on the determination of the level of protein requirements for Macrobrachium postalae. The results did not show any beneficial effect of increasing dietary level of protein from 20% to 40%. It was found that the lack of differences was probably due to improper tank cleaning which caused abondant grow of natural food on the tank surface. It was recommended that another experiment should be conducted using larger size postlarvae, and with proper feeding and tank cleaning.

QUARTERLY REPORT OCTOBER-DECEMBER 1984

Hobart Peters
Livestock Geneticist
RMI Inc., Bogor, Indonesia

A Study of Animal Industry in Java, Bali, Timor and South Sulawesi, October-November 1984. A trip was made on October 15-17 to visit the Dairy Cooperatives at Pangalengan and Lembang, near Bandung in West Java, and the Lembang Artificial Insemination Centre; and this was followed by a second trip from October 25 to November 20 in Java, Bali, Timor and South Sulawesi. The purpose was to obtain first-hand information on the livestock industry and requirements for projects in both large and small ruminant breeding. An account of this travel is presented as Appendix I of this Report.

Improving Dairy Cattle Breeding Stock for Lowland and Upland Milk Production in Indonesia. A project outline under this title was prepared as a comprehensive approach to increasing dairy cattle production. The major features of the proposed project are outlined in Appendix II of this report.

A Program for Improvement of the Bali, Madura and Ongole Breeds of Beef Cattle. For all practical purposes, these breeds may be considered as adapted, utilitarian stocks for commercial beef production in Indonesia. A feasible approach for improvement of their performance is visualized for operations where individual breeders have five or ten to twenty-five or more breeding females in their herds. Selection could be done within herds on the basis of superior performance in such traits as growth rate (weight-for-age), as determined by weaning weight, post-weaning gain or yearling weight, giving due consideration for sex of the animal, age of the dam, and the number of days on test. Ultimately, performance will be assessed in terms of meat acceptable to the consumer per unit of cost.

Alternatives in Crossbreeding for Range Beef Production. More complex mating designs are feasible where exotic breeds are used for crossing with the adapted native stocks in ranch herds. As an illustration of this approach, a part of the ranch could be used for producing replacement crossbred cows (and male beef stock) of a combination such as Ongole, Brown Swiss and Brahman, while another would contain young cows of this combination inseminated with Bali semen to avoid calving problems that result from dystocia (difficult parturition), and mature cows of the same combination inseminated with Aberdeen Angus, Charolais or Simmental semen. Such a scheme requires organization but allows the producer to gain benefit of the sources of specialized breeding stocks that are available for particular purposes in the beef production enterprise.

APPENDIX I

REPORT ON A STUDY OF ANIMAL INDUSTRY IN JAVA, BALI, TIMOR AND SOUTH SULAWESI

OCTOBER - NOVEMBER, 1984

Hobart Peters
Livestock Geneticist
RMI Inc.
Bogor, Indonesia

REPORT ON A STUDY OF ANIMAL INDUSTRY IN JAVA, BALI, TIMOR AND SOUTH SULAWESI OCTOBER - NOVEMBER, 1984

Hobart Peters
Livestock Geneticist, RMI Inc.
Bogor, Indonesia

INTRODUCTION

In connection with the work particularly concerning small ruminants under the CRSP program, I had made previous trips in Java, and to South Kalimantan and North Sumatra, in April to September 1984. These were reported in the Quarterly Reports to RMI Inc. for that period. The major purpose of the travel reported herein was to obtain first-hand information on requirements for projects in animal breeding, with particular reference to large ruminants, given the objectives of the Government, the resources at hand, and the program of work already in progress.

A trip was made in the company of Ir. Sori Basya Siregar, Dairy Cattle Specialist with the Central Research Institute for Animal Science (CRIAS) at Bogor, on October 15-17 to visit the Dairy Cooperatives at Pangalengan and Lembang, near Bandung in West Java, and the Lembang Artificial Insemination Center. This was followed by a second trip from October 25 to November 20 in Java, Bali, Timor and South Sulawesi, accompanied by Ir. Subandriyo, Geneticist and Sheep Specialist at CRIAS, Bogor, in all areas with the exception of South Sulawesi, where Ir. Tatang Ibrahim, Forage Crops Specialist at the Gowa Research Station near Ujung Pandang, served as guide and counterpart, and with the further exception of our visit to Malang and Jombang on our return to East Java, where Ir. Ahmad Musofie of the Grati Research Station similarly served as guide and counterpart.

On behalf of my wife, Erna M. Peters, who accompanied me in these travels, and myself, I wish to express our appreciation to Ir. Bahron Abas, Director of P.T. Bina Mulya Ternak, and his staff, for the kindness and hospitality extended to us during our visit to the BMT Ranch at Maiwa, in South Sulawesi.

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ITINERARY

Trip to Bandung for Visit to Dairy Cooperatives

Oct. 15	Drive to Bandung with Ir. Sori Basya Siregar.
Oct. 16	Visit to Pangalengan Dairy Cooperative.
Oct. 17	Visit to Lembang Dairy Cooperative and the Lembang Artificial Insemination Centre.

Trip to East Java, Bali, Timor and South Sulawesi

Oct. 25	Drive to Yogyakarta.
Oct. 26	Visit to Animal Diseases Investigation Laboratory and participating Can. Int. Devel. Agency team; visit to dairy production project at Kaliurang.
Oct. 27	Visit to Animal Husbandry Dept., Gadjah Mada University.
Oct. 28	Drive to Ungaran, Klepu Sub-Balai; visit to livestock market, largely of Ongole cattle, sheep and goats, at Ambarawa en route; to Semarang.
Oct. 29	Sheep and Goat Station at Kendal; visit to Goat Multiplication Center at Purworejo; drive to Salatiga.
Oct. 30	Meeting with Ir. Sunarto and staff at Boyolali dairy production center; drive to Surabaya.
Oct. 31	Visit cattle breeders in Madura.
Nov. 1	Grati Research Station; drive to Jember.
Nov. 2	Jember Goat Station; Sheep Station at Garahan; drive to Denpasar, Bali.
Nov. 3	Bali cattle breeding center.
Nov. 4	Denpasar.
Nov. 5	Udayana University; visit with livestock and forage crop researchers.
Nov. 6	Flight to Kupang, Timor; meet Drh. A. Manafe.
Nov. 7	Visit to Lili site for Research Station; Animal Husbandry Training Center.

Nov. 8	Visit to Australian project; observe cattle finishing with legume supplementation.
Nov. 9	Visit with livestock scientists at Nusa Cendana University.
Nov. 10	To Denpasar; Ir. Subandriyo return to Bogor.
Nov. 11	Flight to Ujung Pandang.
Nov. 12	To Gowa with Ir. Tatang Ibrahim; meet Australian scientists Chris N. Jacobsen (Forage Crops) and Michael Hunt (Livestock); visit to forage crops test area; meeting later with Ir. Bahron Abas, Manager of P.T. Bina Mulya Ternak (BMT).
Nov. 13	Drive to Maiwa for visit to BMT Ranch.
Nov. 14	BMT Ranch; return to Ujung Pandang; flight to Surabaya.
Nov. 15	Surabaya.
Nov. 16	Accompanied by Ir. Musofie and Niniek Kusuma Wardhani to Malang; meet Handoyo Soesetya, Dairy Cattle Specialist.
Nov. 17	Visit to Animal Husbandry Department at Brawijaya Universit Animal Husbandry Training Center and Dairy Unit; Singosari Center; dairy meeting at Jombang; drive to Magetan and Yogyakarta.
Nov. 18	To Ungaran for visit with M. Sabrani; return to Yogyakarta.
Nov. 19	Visit to Gadjah Mada University; drive west and visit Baturraden Dairy Cattle Multiplication Center.
Nov. 20	Visit to Lembang A.I. Center; return to Bogor.

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DAIRY CATTLE PRODUCTION

Dairy Cooperatives in the Bandung Area of West Java

Discussions of dairy cattle breeding policy in the tropics generally center on the subject of climatology, which is related to altitude and the amount of heat stress the breeding and milking stock will have to endure in the area under discussion. Holstein-Friesian cows perform well in the Cooperative at Pangalengan, 40 km south of Bandung in West Java, in a mountainous area 1,200 to 1,400 meters above sea level at 18 km northward from Bandung.

The main resource income of the people of Pangalengan is agriculture, and many of the farmers in the area keep dairy cattle, mainly Holstein-Friesians bred artificially.

The South Bandung Dairy Cooperative (KPBS Pangalengan) had 4,705 members with 10,404 cattle, including 5,358 milking cows said to be producing 34,661 liters per day in 1983. The Cooperative markets pasteurized milk, 70% of it to the Milk Industries Ultra Jaya, Friesche Vlag Indonesia and Foremost Indonesia, and performs other services as well as acting as a facility for the field training of the farmers. It was stated that 80% of the milk goes to Jakarta.

The Lembang Cooperative Association of Milk Producers (KPSBU), with 1,300 farmer-members, have some 4,000 milking Holstein-Friesians, bred artificially.

In both cooperatives the farmers supply cut-and-carry roughages and a grain allowance to their dairy herds. The average number of cows per farmer is three to five head, though herds of eight to ten or more cows were seen. The cows are tethered and become weak from lack of exercise; the population density in the area may in fact restrict free movement. In both cooperatives there is an interest in milk recording and selection to improve the performance of the breeding stock. Male calves remain entire and are sent to Union Livestock Co. at Sukabumi at about 10 days of age where they suckle for 4 months prior to slaughter for beef production. There are prospects for selection among these bull calves for potential dairy sires if the productivity of their female relatives can be assessed.

Dairy Production Unit at Yogyakarta

A visit was made to the Dinas Peternakan Unit Pelaksana Tehnis at Kaliurang, Daerah Istimewa Yogyakarta. The Unit is engaged in the production of milk, rabbits, chickens and eggs for local consumption, and forage seeds and seedlings.

The Holstein-Friesian herd includes 15 cows, bred by use of semen of two bulls at Lembang and one at Surabaya. Production ranges from 4½ to 16 liters per day and 1,500 to 3,082 liters per lactation over 9 to 12 months. The annual conception rate of these cows is 60 per cent. Ninety per cent of the villagers in the District of Kaliurang have two or three cows. No machine milking is done.

Bull calves are sold at 1 month of age, castrated, fed a ration including some concentrates, and slaughtered at 6 to 18 months of age, weighing 75 to 150 kg, for domestic meat production. These calves weigh about 35 kg at birth. Most of them are fed in the Boyolali area, where a substantial number of Ongole and Holstein-Friesian cattle are fattened for the Jakarta market.

Milk Treatment at Boyolali

Dr. Sunarto, Manager of the Gabungan Koperasi Susu Indonesia (GKSI) milk treatment program at Boyolali, represents 20 milk "producers" (collectors) supplied by 4,000 farmers with 6,000 to 8,000 cows in the Cooperative and an additional 4,000 farmers with 30,000 cows in Central Java. He indicated that the market could use 50 per cent more milk. The Cooperative supplies veterinary, animal husbandry, nutritional, milk technology and Cooperative supervisory assistance to the industry. Starting in 1985, the organization plan to powder milk at Salatiga. However, there is an interest in cattle at Boyolali for manure as fertilizer and for draft purposes as well as for beef and milk.

Grati

There are two nutritionists, Niniek Kusuma Wardhani and Ahmad Musofie, at the Sub-Balai Penelitian Ternak at Grati in East Java,

who are actively engaged in constructive dairy cattle breeding research. There are 44 cows and heifers of the Grati breed of dairy cattle at that Station. The Grati breed was founded on Holstein-Friesian and zebu stock, but is recognized as having less than 10 per cent zebu ancestry. Nevertheless, though producing less milk than the Holstein-Friesian breed the Grati cattle are regarded as having somewhat better adaptation to the lowlands of East Java.

Data were obtained from staff at the Grati Research Station on dairy cattle performance at three locations: Jombang (lowland, about 200 m), Grati (lowland), and Nongkojajar (highland); calving intervals were similar at the three locations. Length of lactation averaged 301 days for local Friesians at Grati and 292 days for local Friesians at Nongkojajar ; for Australian Friesians the average was 278 days at Jombang and 294 days at Nongkojajar. Total production of milk over a 305 day lactation averaged 2,022 kg for local Friesians at Grati and 3,073 kg for local Friesians at Nongkojajar; the averages for Australian Friesians were 2,566 kg at Jombang and 3,506 kg at Nongkojajar.

The Batu Training Center for Dairy Husbandry

This is one of 23 Training Centers for Agriculture in Indonesia, and the only one developed strictly for Dairy Husbandry. A dairy cattle production operation is conducted at the Center, with some scope for exploring alternative production and management techniques, and facilities are available for lectures and demonstrations.

Baturraden Breeding Center

There is an attractive brochure (1982) describing the Baturraden Breeding Center (Central Java). The Center has the function of livestock and forage breeding for the Technical Implementation Unit of the Directorate General of Animal Husbandry. Specifically, this entails supplying breeding stock of dairy cattle and swine and planting material for animal feeds. The Center occupies over 141 ha of land located about 14 km from Purwokerto at an altitude of 561 - 758 m above sea level, with temperature of 18 - 28°C, humidity of 70 - 80 mm Hg, and rainfall of 4,000 mm or more annually. Up to December 1982, 1,892 head of dairy cattle breeding stock

had been distributed. Average distribution of swine per year up to that time was 300 head. It has been planned that the Baturraden Breeding Center be developed as a National Dairy Development Center, with breeding herd, facilities for training of staff and dairy farmers, and establishment of a milk processing plant and pilot marketing project.

The Baturraden project was started in 1952. At present the herd comprises 140 milking Holstein-Friesian cows. Breeding stock has been imported from Holland, Denmark and Australia, though semen has been obtained from Australia, New Zealand, United Kingdom, West Germany and United States since 1983. It was stated that the top milk yields are obtained in the fourth lactation (and from stock founded on semen from United States). Yields of 4,000 kg of milk are obtained in a 10 month lactation; first calvings are at 27 months. A dairy training center is being built at a site 2 km away from the Baturraden Breeding Center.

We were told at Baturraden that the Holstein-Friesians were located primarily in Java, the larger cities of Sumatra, in East Kalimantan, Bali, and at Ujung Pandang -- and that a bull of this breed had been delivered to Ambon, Maluku.

THE ARTIFICIAL INSEMINATION CENTERS

There are two "A.I." Centers, one at Lembang in West Java, and the other at Singosari in East Java. They are both fine facilities, and an impressive lot of bulls can be seen at both Centers. Since 1976, semen of bulls of the Bali, Ongole, Holstein-Friesian, Brahman, Hereford, Simmental, Charolais, Limousin, Santa Gertrudis, Belmont Red and Droughtmaster breeds has been used at Lembang. However, since early 1983 only semen of the Brahman, Ongole, Holstein-Friesian and Murrah buffalo has been used at Lembang. Substantial numbers of swamp buffalo cows in Java have recently been inseminated with Murrah semen. At Singosari, semen of the Brahman, Holstein-Friesian, Ongole, Bali, Madura and Santa Gertrudis breeds has been used; however, no Santa Gertrudis semen has been used since 1983.

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THE GOAT AND SHEEP MULTIPLICATION CENTERS

The Goat Multiplication Centers at Kendal and Purworejo and the Sheep and Goat Multiplication Center at Jember were visited en route to the eastern parts of Indonesia.

Kendal, Central Java

The Kendal Goat Multiplication Center has building capacity for 600 breeding goats. At the time of our visit the Center had an inventory of 491 head, including 22 mature bucks, 81 young bucks, 274 mature does and 104 young does, of grade Etawah breeding; and 3 mature bucks, 5 mature does, and 2 young does of the Saanen X Etawah cross. The intent of discontinuing work with the Saanen cross was expressed. It was stated that although there was building space for a larger herd, the feed supply was adequate only for a herd of 500 breeding does. The foundation stock were does obtained from Central Java and the largest bucks available. Selection is based on weights at birth and weaning, with the top 50% of the females and the top 15 to 20% of the males being selected.

It was stated that of 300 kids born per year, 75 does and 5 bucks are selected. Average "litter size" (excluding "barren" does) is 1.7. The young goats are weaned at 90 days, and the best 20% of the dams are milked for 1½ months to supply extra milk to the younger kids. Milk yields average 1 liter per day. Kid mortality at birth averages 2 per cent. Weaning weights average 12 kg with a standard deviation of 1.2 kg. During 1981 to 1984, 146 bucks and 387 does were supplied as breeding stock to farms.

Purworejo, Central Java

The Purworejo Goat Multiplication Center is located high in the mountain territory west of Yogyakarta. A major purpose for the Center is to provide manure as fertilizer; other purposes are to provide meat and sell breeding stock.

The breeding population includes 86 does and 6 bucks of the Etawah breed; there were 39 male and 65 female kids. Kids are weaned at 2½ to 3 months. Selection is based on meat production traits, primarily growth rate and body conformation. Close to 100% of the does have offspring yearly; the kidding interval was said to be 9 months. Kids are weaned at 1½ months. Values for breeding stock in the area were Rp 75,000 - 100,000 for a buck and Rp 60,000 - 70,000 for a doe at 1-1½ years of age.

Jember, East Java

The Jember Multiplication Center has both goats and sheep. The goat herd included 15 bucks and 200 does of the Etawah breed. Kids are weaned at 3 to 4 months of age. The does are bred at 9-month intervals. The sheep flock includes 20 rams and 200 ewes bred at 8-month intervals. Weaning is at 90 days.

In the sheep flock, Dorset-Merino X Fat-tail and Suffolk X Fat-tail rams were crossed on Javanese Fat-tail and Thin-tail ewes an backcrosses were made to the breeds of sire. In addition, Fat-tail ewes have been mated with Fat-tail rams.

BEEF CATTLE BREEDS OF INDONESIA - THE ONGOLE, MADURA AND BALI

The Ongole is the white zebu common to all regions of Java and Indonesia generally. Ongole are commonly seen beneath the yoke as draft animals and in many fields as growing beef stock. They were seen at all altitudes in East Java. They ordinarily do not seem large, yet some very large Ongole bulls were seen at the Singosari A.I. Centre. On the flat lands of East Java, westward from Surabaya, cattle of this breed were seen in relatively large numbers.

A trip was made into Madura to see the Madura cattle. They are red in color and appear to have proportionally greater length of limbs and of body than their relative, the Bali cattle. The Madura resulted from crossing of Bos taurus and/or Bos indicus with B.(Bibos) spp., while the Bali is a domesticated form of B. (Bibos), according to G. Williamson and W.J.A. Payne in "An Introduction to Animal Husbandry in the Tropics" (Longman, London).

The Madura breeders expressed an interest in performance testing to assist them in breed improvement. They staged a show of Madura bulls in harness. A pair of bulls are driven up to a timber laid across the way, which they mount, standing with their forefeet on the timber and posing for the spectators. The sport of bull racing is common but was not observed on this occasion.

During a visit to Brawijaya University in Malang, East Java, we met R.H.B. Soesetya at the Faculty of Animal Production at that institution who has co-authored, with Kees Slingerland, a paper (In Press) on "Estimation of Body Weight by Chest Girth in Madura Cattle", and this information could be useful in developing a performance testing program for Madura cattle.

A project has been under way in Bali since 1977 for improving the genetic merit of the Bali cattle. This involves work directly with farmers as well as central testing facilities. The Bali heifers reach puberty (first estrus) at 14 to 24 months of age -- feeding has been found to hasten attainment of puberty; estrus lasts for 17 to 48 hours. The females calve first at 30 months, generally. Birth weights are 14

to 18 kg, according to the sex of the calf. Farmers wean over a wide range of ages, programming for 205 days at a weight of 82 kg. However, weaning weights were said to average up to 100 kg with mature cow weights of 240 kg, though it is believed that improvement is being made in weight for age. Ninety-five per cent of the farmers with cattle were said to have them primarily for draft purposes. A gentle temperament is important. However, spokesmen say two types of cattle are needed: one for draft and one for meat production. Milk is imported from East Java.

Bali cattle are said to calve easily. Cows identified as sterile are slaughtered; females live to 11 or 12 years of age. Male stock not kept for breeding are slaughtered at 18 months, at time of turning dark in color. There are some 380,000 Bali cattle on the Island.

A meeting was held with livestock professional staff at Udayana University. Dr. Djiwa Darmadja, Professor of Animal Production, was there, as well as several Nutritionists and other Animal Production professionals. They have 419 students attending in animal husbandry, 30-40 to graduate.

Farms range from 1/2 ha to 5 ha in size. It is expected that Bali cattle production will continue as a predominant agricultural enterprise, with production of fodder (including rice straw) a major farm activity, and grass, shrubs and legume trees forming a prominent three-stratum forage complex. Banana stems are fed to provide water, improve the mineral status, and increase cattle growth. Elephant grass was introduced, though some areas are said to be too dry for this species. Brachiaria is used in west Bali and is included in reseeding generally in Bali. Five years' research had been done on use of grasses under coconut trees.

Dr. Darmadja cited work by one of his colleagues, Dr. I.B. Arka, ("Effect of Fattening on the Meat Quality of Bali Cattle", Dissertation, University of Padjadjaran, 1984), which showed that the aroma, tenderness, and palatability of Bali beef were improved by supplementing a grass diet with one of 70% grass and 30% concentrate, and that further improvement resulted when a diet of 60% grass and 40% concentrate was used. In his own work "Half a Century Traditional Cattle Husbandry Within the

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Agricultural Ecosystem of Bali", Dissertation, University of Padjadjaran, 1980), Dr. Darmadja reported as follows on the live and carcass characteristics of bulls, steers and heifers of Bali cattle: live weight, 335 331 and 247 kg; carcass weight, 190, 176 and 138 kg; and carcass percentage, 56.6, 56.5 and 55.8 per cent.

A discussion was held at Denpasar with Ismed Pane, who is developing breeding plans for Bali cattle improvement. He indicated that the Bali cow can calve satisfactorily following breeding to Simmental, Limousin and Hereford bulls if she has had three previous calvings.

Bali cattle figure prominently in ranching and fattening enterprises elsewhere in Indonesia, and reference to these enterprises will be presented in more detail in other sections of this report.

ANIMAL PRODUCTION IN TIMOR

Drh. A. Manafe, senior agriculture official at Kupang, arranged for us to visit two major livestock projects in western Timor and the Animal Husbandry Department at Nusa Cendana University in Kupang.

A trip was made to the village of Lili, about 25 km eastward from Kupang, between Bahau and Caniplong, where the Lili Experiment Station is to be built on a 100 ha tract of land, 30 ha of which is occupied by "Snakma", a livestock High School of the Ministry of Education and Culture. There are some cattle and goats in pens in the area of the future Experiment Station, overlooking the School which, with its green roofs and the long slope rimmed with mountains in the background, provides an attractive setting. The Station will be available for research in breeding and nutrition of beef cattle and draft animals under the direction of Dr. Abdullah Bamualim, presently at Bogor.

The other major livestock project visited in Timor was the Australian Project in the Besipae area, occupied by four villages. This is a mixed farming project established since 1980. There are five full-time and three short-term specialists working in this project. Colin Piggin is the project leader.

The number of cattle per person in the area ranges from one to ten, with some exceptions; there are 30,000 cattle within a radius of 15 km of the ranch head-quarters; there are 50 km of fence to facilitate experimental work.

Horseflies are a problem to livestock raising, and a second challenge to the industry results from the long annual dry season and the need to maintain an adequate supply of fodder for the livestock as well as an adequacy of protein, vitamin A, and other nutrients that may be lacking seasonally. Therefore, in developing the Lili Experiment Station, research in nutrition and forage utilization as well as management will require consideration.

The other major research priority will be the development of a sound beef cattle breeding program, including a suitable choice of breeds, a breed improvement regimen, and a crossbreeding scheme which will provide the requisites of hardiness and maternal ability in the cow and efficient growth and carcass merit in the market animal.

During the visit to Timor there was mention of various crosses that have been made in the region, including use of Australian Brahman sires on Ongole cows in Sumba, where there is a population of 40,000 to 50,000 Ongole cattle. There are in the order of 10,000 Ongole cattle in Timor; and some Madura cattle, although numbers of the Madura are said to be declining. There is a desire to establish an abattoir at Kupang, ultimately, to enable shipments of beef to Jakarta. The Timor Livestock Co. had an abattoir for two years, we were told; this was at Wini in Central Timor.

There is a role for pigs also; there are two white Dutch breeds kept near Kupang, and black pigs were seen. The role for goats and poultry offers other prospects.

The climate, vegetation and topography of this area are different from any previously seen during our travel in Indonesia. This was the dry season; the trees were bare, and of a grey hue. During the wet season, which lasts for 3 1/2 to 4 months, rains bring the annual rainfall to a total of 1,000 mm, and one to two tons of grass per hectare are produced. The area consists of high, steep slopes and deeply cut ravines; the highway into the project

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headquarters is gravelled, with coarse pebbles up to 8 or 10 cm in diameter, and evidently can be slippery when wet. Some people live 6 to 7 km from water; a resident will carry 20 liters of water such distances, sometimes twice in a day. Dams for water catchment are being built and these provide great relief from this burden for the residents.

A major animal industry in western Timor is the fattening of Bali and Bali-crossbred cattle, using legumes (largely Leucaena) to supply the essential protein to the diet of the tethered animals.

The team are providing assistance in cattle marketing. A set of corrals was built under the direction of the marketing specialist, Peter Philp, P.O. Box 36, Kupang, who has been in Indonesia for ten years. The cattle are worth Rp 700 per kg live weight; a young bull at 15 months will bring Rp 65,000 to Rp 75,000; fat cattle sell for Rp 210,000 if they have reached 300 kg live weight. There are about 360,000 Bali cattle in Timor, and various crosses on the Bali are being made.

BEEF RANCHING IN SOUTH SULAWESI

Gowa Research Station

The Gowa Research Station is being developed on an area of level land near Ujung Pandang. Presently it is occupied largely by the BPT Forage Research Project ATA-201. An intensive program of forage crops testing is in progress. Interviews were held with the Animal Production Specialist, Michael Hunt, and the Agrostologist, Chris M. Jacobsen, at their office in Ujung Pandang prior to a tour of the plots conducted by Jacobsen. Tatang Ibrahim, Agronomist, maintains liaison between the Research Station and the Ranches.

The Bina Mulya Ternak Ranches (BMT)

The Government Ranching Corporation, BMT, has an attractive colored map mounted on a wall in the Guest-House at the Maiwa Ranch, which we visited in the company of Tatang Ibrahim. The ranches shown on the map were the following:

No. 1 in Kabupaten Wajo, area 4,583 ha,
No. 16 in Kabupaten Wajo, area 12,170 ha,
No. 17 in Kabupaten Enrekang, area 5,230 ha,
No. 18 in Kabupaten Sidenreng Rappang, area 5,090 ha,
No. 29 in Sumba Timur, area 9,908 ha.

Ranch Nos. 16, 17 and 18 were established in 1973 and Nos. 1 and 29 in 1976. They total almost 37,000 ha of land area.

We met with Ir. Bahron Abas, Director of PT Bina Mulya Ternak (Persero) in Ujung Pandang, prior to our drive up to the Ranch at Maiwa (Kabupaten Enrekang). He described the Ranch cattle breeding program and expressed an interest in making the Ranch herds available for research in cattle breeding and production in cooperation with BPT.

The scene in the area of the Ranch at Maiwa is one of rugged beauty. The Ranch has fenced pastures, corrals and weighing facilities including a digital scale. The challenge of making the BMT range produce at the level of its potential beef production seems impressive, and worthy of a major research effort.

The diseases and debilitating conditions occasionally affecting the livestock in Sulawesi include anthrax, hemorrhagic septicaemia, "surra" (trypanosome infections), worms, heat stress, and seasonal nutritional deficiencies, particularly the low digestible energy and protein content of the forages. Dry matter and energy content of the fodder are reduced in the wet season. Growing stock up to breeding age may receive supplementary rice bran and coconut meal (2 to 3 kg per head daily) and 250 to 500 g of urea - molasses supplement per head daily plus salt. In collaboration with researchers at Ciawi, supplementation with vitamins and minerals is being investigated.

Two mating seasons of 3 months duration are maintained annually, in June to August and December to February. Pregnancy tests are performed. Cows bred in Sulawesi include 2,500 to 3,000 Bali, 5,000 Brahman cross-breds (50% are 3/4 Brahman and 50% are 7/8 Brahman), and 600 P.O. (basically Ongole with some other ancestry). In Sumba, 1,500 Ongole, 500 Brahman cross, and 1,000 swamp buffalo cows are bred on BMT ranch territory. Five to 10 bulls per 100 cows are the proportions maintained in the breeding herds.

THE ROLE OF THE BUFFALO

J.B. Moran of Australia, and for a period with BPT at Bogor, commented as follows on the role of the buffalo in 1981 (World Review of Animal Production 17(4): "They are more widely dispersed throughout the outer islands than are cattle and are favoured over cattle for drought in wet land area and on the more dense soils or where the soil structure may be damaged by the hooves of cattle. A small number of Murrah river buffalo are used for milk production in North Sumatra. In the swamps of South Kalimantan during the wet season, buffaloes are allowed to free graze water hyacinths and grasses in up to two meters of water during the day and are yarded onto platforms at night. They are kept in herds of about 150 animals but the total number of animals involved is only 100,000".

Having observed the buffalo in these situations, their broad hooves, their docility, children mounted upon their backs, and their patient labors in the fields, one is compelled to feel the greatest respect for these

gentle and hardy beasts. The current use of Murrah semen on swamp buffalo in Java will create a population of thrifty hybrids with increased efficiency of feed utilization in meat production, productivity of milk (as compared with the swamp buffalo), reproduction, and general health and power of the draft animals.

Meanwhile, swamp buffalo raisers have a contribution from the scientists to assist them in assessing growth. Mursyid Ma'sum and R.H.B. Soesetya, in Agrivita 6(2), July-December 1983, have published a paper on "Growth Pattern in Terms of Heartgirth Measurement in Swamp Buffalo in East Java, Indonesia".

APPENDIX II

CENTRAL RESEARCH INSTITUTE FOR ANIMAL SCIENCE

PROJECT OUTLINE

TITLE: Improving dairy cattle breeding stock for lowland and upland milk production in Indonesia

LOCATION:

(a) Pangalengan, West Java (Upland Village)
(b) Jombang, East Java (Lowland Village)
(c) Baturradin, Central Java (Upland Station)
(d) Grati, East Java (Lowland Station)

EXECUTING AGENCY: CRIAS

OBJECTIVES:

1. Development of dairy cattle with adaptation to the altitudes and climatic conditions of Indonesia in terms of health, production and reproduction parameters.

2. Training for, and implementation of, a pilot milk recording program which will assist in establishing selection procedure for improving dairy cattle in upland and lowland.

3. Utilization of agricultural by-products for dairy cattle feeding.

IMPORTANCE:

There is a relatively small population of dairy cows, while the demand for milk is increasing. The productivity of the dairy cows in Indonesia is low due to low genetic potential of the breeding stock, nutrient deficiencies and disease, and training is required to improve the technical skill and knowledge of dairy producers. At the same time, there is an infra-structure and facilities are in place to permit establishing and conducting a sound and dynamic dairy cattle breeding and development program that will assist in correcting the deficiencies currently hampering dairy production in Indonesia.

Quarterly Report: October 25, - December 31, 1984

Dr. Joel Levine
Animal Breeder/Farming Systems Specialist
Research Institute for Animal Production
Applied Agricultural Research Project

Major Activities:

The consultant began his AARP assignment on October 25, 1984. He was assigned by RIAP to work with both the Breeding and Farming Systems Groups. An initial work plan for Dr. Levine's assignment was established as follows:

Preliminary Scope of Work: Dr. Joel Levine, Animal Breeding/Farming Systems Specialist, Balai Penelitian Ternak Bogor.

At the request of BPT I am working with both the Breeding and Farming Systems Groups. Major proposed activities include:

I. Characterization of major livestock breeds in Indonesia.

With the exception of some data on sheep and goats in West Java there is little good production data on the major livestock breeds in Indonesia. Without this basic production information, breeding research and breed improvement is difficult. On farm survey activities are planned to collect data

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on the following breeds:

A. Bali cattle ---- surveys planned beginning in late February in Kupang NTT and South Sulawesi, areas of large concentrations of Bali Cattle. The Kupang survey will be part of a baseline survey effort to help start activities at the new sub-Balai planned there.

B. Ongole cattle and their crosses. Using BPT's sub-Balai in Klepu, Central Java (Kab. Semarang, near Ungaran) as a base, survey work in Central Java to obtain basic production information on the Ongole breed and the many crosses there. These cattle are used for a combination of draft, dairy, and fattening.

C. Comparison of different sheep and goat breeds in Central Java --- same locations as for Ongole.

II. Monitoring and Evaluation of Introduction of New Technologies in Mixed Farming Systems. (Citanduy and new watershed project).

Livestock and livestock related activities (e.g., leguminous feeds) are part of Citanduy and new watershed projects. I will assist with developing these activities and especially developing a computerized monitoring system to collect and store data.

III. Socio-economic surveys in North Sumatra.

As part of opening of new sub-Balai in Sei Putih, North Sumatra I have been asked to help conduct some background baseline surveys. It is hoped that CRIAS will adopt as standard policy the need to obtain production information from surrounding farmers before making any detailed research plans for new-Sub Balais.

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IV. Data processing and analysis. Countepart training in computerized data collection, processing, and storage.

A number of previous surveys and breeding experiments have been conducted but data not properly stored nor analysed. With present limited availability of microcomputers and possible future procurments of additional units, I will work with staff to set up computerized data collection, storage, and analysis techniques. This will include training of counterparts in use of the new computers. Thi has been identified as a major constraint to research activities in BPT.

In accordance with the above plan field trips were made during the quarter to Central Java and to North Sumatra. The field trip to Central Java was to visit RIAP Sub-Balai Klepu near Unggaran and see field locations nearby as well as in Kab. Pekalongan and Demak where Farming Systems Research projects have begun. As a result of that visit during the last week of November and the first week of December a research plan to evaluate large ruminants in Central Java was developed. This is attached as Appendix One. A similar work plan has been developed to evaluate the Bali breed of cattle (Sapi Bali) in connection with the beginning of research activities at the new Sub-Balai Lili near Kupang, NTT. This is attached as Appendix Two. Similar activities to obtain production data on Bali Cattle will be conducted in South Sulawesi if budget and manpower are available from RIAP.

A second field visit was made in mid-December to Sub-Balai Sei

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Putih in North Sumatra, near Galang (about 50 km S.E. of Medan). The purpose of this visit was to assist Sub-Balai and Small Ruminant (SR-CRSP) research staff conduct a village level production survey in three kecamatans surrounding the station. Results of that survey will be written up during the next quarter.

Other activities during the quarter included assisting Breeding Staff personnel in data analysis of previous experimental work and in editing of a report on the Provincial Development Program being prepared by RIAP staff.

Publications during the quarter:

The Status of Ruminants in Indonesia With Special Reference to Research Needs. by Henk C. Knipscheer and J. Levine, Research Institute for Animal Production (background material on research priorities prepared for U.S.A.I.D.).

Seminars during the quarter:

"Simulation of Livestock Production Systems with Special Reference to Tropical Conditions " -- RIAP- I.P.B. Fak. Peternakan Breeding Discussion Group.

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"The Use of Microcomputers to Monitor and Evaluate Rural Development Projects. Case Studies for Livestock and Food Crops from NTB." - U.S.A.I.D., Jakarta.

Survey of Cattle Production Systems in Timor, NTT. An Evaluation of Sapi Bali. Farming Systems Research for Sub-Balai Lili, Kupang, NTT.

Background:

Bali cattle (Bos Sondaicus) comprise 15 - 20% of the estimated 10 million large ruminants in Indonesia. Large numbers of Bali cattle are found in the provinces of South Sulawesi, Bali, NTB, and NTT with numbers increasing in Central and Southeast Sulawesi, Kalimantan, and the transmigration provinces of Sumatra due to government (BanPres) and foreign aid assisted projects (IFAD, SESTADP, PDP,). Bali cattle are believed to be superbly adapted to the humid tropics and originate from domestication of wild Banteng found only in Southeast Asia (primarily Indonesia). Despite their importance, especially in Eastern Indonesia, little good data exist on their performance under the village and smallholder conditions where they are raised. The new planned BPT Sub-Balai Lili near Kupang, NTT on the island of Timor is located in an area with large concentrations of Bali cattle. The opening of this sub-Balai provides an excellent opportunity to obtain production oriented data on Bali cattle in the Kumpang and Timor area. These data would be useful as part of a much need national data base on this important livestock species and could also be used as a data base of local producers' livestock production systems. These data could provide useful information on current production practises and problems which could help provide research priorities for the new Sub-Balai as it begins work. It is therefore proposed that the following survey/research activities be carried out:

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I. Preliminary Exploratory Survey of Cattle Production Systems in the Kupang area:

As early as February - March, 1985 a simple exploratory survey could be carried out in the vicinity of Sub-Balai Lili. The purpose of the survey would be to familiarize BPT personnel with local production conditions and to establish contact with local producers. This first survey would collect data on landholdings, livestock populations, types of management, feed, marketing systems, and any obvious problems that local producers face. These data should be quickly analysed and help provide guidelines for initial research priorities at Sub_Balai Lili.

II. Followup- surveys:

As early as May-June, 1985 a more comprehensive followup survey should be conducted among cooperating producers in the vicinity of the Sub_Balai. Based upon information collected in the exploratory survey a field questionnaire could be designed and tested which would obtain data to form a first data base of production conditions of Bali cattle in Timor, NTT. Socio-economic as well as biological factors which may limit animal production will be included in the survey. For example, it is known that lack of marketing outlets is sometimes a constraint to increased animal production in NTT . These data should also be useful in providing research guidelines and establishing priorities for the Sub-Balai.

III. Monitoring of Selected Livestock Producers. On-Farm Testing of Components of New Production Systems.

Accurate production parameters for Bali cattle can only come from longer-term monitoring of selected farmers. At least three years would be required to obtain reliable information on reproductive performance, growth rates, and mortality. During this time experiments (feeding trials, routine medication, selection experiments) could be conducted in cooperation with some local producers. These on-farm trials of experimental techniques could provide useful feedback to experimental work ---

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especially the cultural responses of local producers to any suggested improvements --- and treated and untreated livestock populations could be monitored and compared.

IV. Periodic Evaluation of New Recommendations.

As experimental work gets underway a farming systems component of research at Sub_Balai Lili would provide a good method to test new recommendations and research results while ongoing survey and monitoring work will develop a sound data base for production paramters of Bali Cattle in Timor.

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Sudarsip H.

To: Dr. William Collier 28/1/1985

Chief of Party

Applied Agricultural Research Project

From: Dr. Joel Levine

Animal Breeder/Farming Systems Specialist

Research Institute for Animal Production

Re: Accomplishments to date/work plan for the next three years.

I. Accomplishments to Date:

As of end of January, 1985 I have completed three months' work at RIAP, assigned to both Farming Systems and Breeding groups in the institute. Major accomplishments have included:

A. Organized a multi-year farming systems/animal breeding research plan to evaluate major large breeds of livestock (cattle and buffalo) in Central and West Java, NTT, and South Sulawesi.

B. Conducted a socio-economic village level survey of livestock production systems in fifteen villages in estate crop areas of North Sumatra in cooperation with staff of Sub-Balai Penelitian Ternak Sungai Putih . Trained staff at this Sub_Balai in data collection and survey techniques.

C. Began ongoing work to assist RIAP breeding staff in statistical analyis and technical write- up of existing data and experimental work.

D. Assisted Farming Systems group to develop a budget and workplan to participate in the upcoming Upland Watershed Research Project in Central and East Java.

E. Assisted CRIAS in compiling an equipment list for assistance under AARP. Helped identify two RIAP candidates for short-term overseas training and assisted Training Specialist with processing these two candidates.

II. Future Work-plan:

To carry out activities described above. Major work will be to try to get good production oriented data from field surveys/monitoring of major breeds of cattle and buffalo (up to three years required from March 1, 1985) and to assist CRIAS/RIAP and especially breeding staff to develop the capability to store, analyse, and write up results of data gathering activities.

Breed Evaluations of Large Ruminants:
Ongole/Ongole Crosses and Buffalo in
Central Java and D.I.Y.

I. Background:

For more than fifteen years Dinas Peternakan personnel have been carrying out a widespread program of Artificial Insemination and Breed Importation in Central Java and other provinces . Using frozen semen mainly from Holstein- Freisan sires, but also from Simmental, Hereford, Charolais, and Brahman sires, as many as 20 - 25,000 crossbred calves have been born per year in Central Java alone. In addition several thousand Holstein-Friesan, Holstein-Freisan -Saihiwal, and Brahman cattle have been imported into Central Java in the past five years under various domestic (APBN, BanPres) and foreign aid programs (EEC - Italy, Dutch, and American programs). In a few areas (Kab. Brebes) attempts have been made to cross Murah and Swamp type buffalo and in other areas (Kab. Demak) buffalo are to be imported from Australia. All of these activities amount to a major national effort to change the genetic makeup of the cattle and buffalo herds of Central Java yet to date, more than fifteen years after these activities have begun, very little information exists on the success or failure of the various types of cross-breeding schemes and it is not yet possible to evaluate the various types of crossbreeds or cattle and buffalo raising schemes that currently exist. It is therefore proposed that a research project be started to evaluate the types of large ruminants (cattle and buffalo) currently found in Central Java, their uses (draft, meat, milk, fattening, savings) , breeding, management, and marketing systems, Government of Indonesia policies and activities in promoting various types of crossbreeding activities, and the profitability of the different types of large animal systems created by GOI policies. Of particular interest would be the changeover from the traditional

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system (grade Ongole cattle used primarily for draftpower and transport) to the newer systems (fattening, dairy, dual-purpose) made possible by the new introduced genotypes. Central Java and D.I.Y. have been selected as the locations for this project because of several factors:

1. The large populations of various genotypes of cattle and buffalo that already exist there.

2. Its relatively short distance from Bogor, so that BPT personnel can frequently go to the field.

3. The interest that Dinas Peternakan TK I in C. Java and D.I. Y. have expressed for this information and the existence of an ongoing cooperative agreement between BPT and C. Java and D.I.Y.

4. The interest and preliminary work already done by BPT staff in BPT Sub-Balai Klepu in these areas. Good contacts already exist with Dinas Peternakan and village personnel.

5. Results of this research would have nation-wide validity, particularly for the rest of Java and other provinces such as North Sumatra where similar widespread A.I., cross breeding, and importing projects have been in existence for a long time.

II. Research Activities:

A. Study of Existing Government Programs and Production Systems.

The first phase of the research would be to study the existing government programs and production systems that have resulted from fifteen years of crossbreeding and importations. Issues to be studied would include:

1. What is Dinas Peternakan current policy on AI? How is AI carried out: what are the types of semen used, the targets, the method of AI, the conception rate. What are the problems in implementation of crossbreeding from Dinas Peternakan's and from recipient farmers' views.

2. What populations of imported cattle and buffalo presently

exist in Central Java and D.I.Y. What is GOI and Dinas Peternakan policy with respect to importing large ruminants? What are the problems in implementation of current policies?

3. A study of existing large ruminant populations in C. Java and D.I.Y. This would include populations of at least F_o, F_1, and F_2 s of cattle and buffalo in locations selected by Dinas Peternakan and would include the following genotypes:

a. Grade and pure-bred Ongole

b. Ongole- Holstein-Friesan and subsequent crosses

c. Ongole - Brahman and subsequent crosses

d. Ongole - Simmental and subsequent crosses

e. Ongole- Hereford and subsequent crosses

f. Ongole - Charolais and subsequent crosses

g. imported Holstein- Friesan, Holstein-Friesan- Saihiwal crosses, their offspring, and any crosses

h. Swamp buffalo, domestic and imported

i. Swamp buffalo - Murah crosses and any subsequent crosses

j. Any other cattle or buffalo breeds or crossbreeds that may be found.

The first phase of the research would rely heavily on farm level surveys and some simple measurements. Survey data would include farm size, livestock populations, use of large ruminants, feeding, breeding, and management systems, disease or other problems, credit, labor use, marketing strategies and market prices. Of particular interest would be the farmer's response to the change in the traditional livestock system which was based on grade Ongole cattle primarily used for draftpower and transport to more specialized and diversified livestock production systems which include milk production and specialized fattening-beef production. The effect of Dinas Peternakan policies on the supply and demand for draftpower would be a main focus of this research as would the profitability measured from input-output and breakeven analyses of the traditional and new production systems. Some simple measurements to be taken would

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include liveweights of all classes and ages of animals, weighing and classifying types of feed on offer and wastage, milk production and length of lactation cycles, heat tolerances, draftpower uses of large ruminants, and labor inputs for all types of production systems. Some estimates of mortalities and reproductive performance would be made, but accurate parameters for these variables must come from longer-term monitoring (see below).

4. At the end of Year One of this project, some specific recommendations could be made on GOI and Dinas Peternakan policies and preliminary breed evaluations made based on the data collected, above. Recommendations to improve AI programs and existing livestock production systems would also be made at the end of Year One.

B. Long-term monitoring of selected populations of large ruminants.

Based on the experience gained and village contacts established during Year One, a subsample of the initial surveyed population should be monitored for an additional two to three years. This monitoring would verify data obtained during Year One, establish accurate parameters for mortality and reproductive performance of the various breed types, and intensively study the different production systems in use in C. Java and D.I.Y. A longer term monitoring activity would also allow time for the introduction of improved systems of animal husbandry (based upon recommendations made at the end of Year One) and their testing and verification. Of particular importance would be the socio-economic and cultural factors influencing farmer acceptance or rejection of recommendations.

C. Large Ruminant Genotype Evaluations and Tested Recommendations for GOI policy and Improved Animal Production Systems.

At the end of a three to four year period it should be possible to have enough survey and monitoring data to evaluate

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the major large ruminant genotypes of Central Java and D.I.Y. Accurate biological parameters (mortality, reproduction, feed utilization, growth rates, milk and draft capacity) should be established and good input-output data on the different production systems in use should allow accurate economic analyses of the profitability of these different systems. With these data it will be possible to advise GOI and Dinas Peternakan on the success or failure of their AI and live animal importation schemes. There could finally be an objective data base to guide and support an important national development effort.

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QUARTERLY REPORT, OCTOBER - DECEMBER 1984

Ruth M. Gatenby

Environmental Physiologist, Balai Penelitian Ternak, Bogor.

In October my two counterparts, Muchji Martawidjaja and Sri Wening Handayani, and I entered the data from our survey of animal housing onto the LOTUS package on the IBM micro-computer. I was new to LOTUS, and my counterparts were completely new to computers. LOTUS is very easy to use, and versatile enough to be able to perform simple calculations and tabulations. It has an exciting graphics package. However, despite discussions with Michele Waldron (computer specialist in BPT Bogor) and Garst Reese (computer specialist in BPT Sungai Putih), I am still unable to remove data from LOTUS in a form which allows it to be used directly in the more advanced statistical pacakages that are available in the institute. My counterparts are enthusiastic about using the computer - computers are regarded as prestige research whereas working in kandangs and getting dirty is regarded as low grade research.

In October I learnt that the AARP have responded to a request I had made through the Director of BPT, and have allocated to me Rp 6 800 000 to purchase micro-meteorological equipment. Together with Pak Bambang, I visited suppliers of instruments in Jakarta and Bogor to obtain the necessary 3 quotations. We are attempting to purchase items from a supplier in Bogor. He has produced a psychrometer, thermohygrograph, milli-voltmeter and automatic thermocouple, but has tried to sell

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us a dubious minature net radiometer, and has not produced the necessary spare parts for the instruments. Negotiations are taking many weeks and are very frustrating.

Dr Eric Bradford and Dr Dave Robinson from the University of Califronia, Davis, U.S.A. have agreed to provide some finance through the Small Ruminant Collaborative Research Support Program (SR-CRSP) to support the research of me and my counterparts in BPT. This is very good news as it has been extremely difficult to operate without a research budget.

The Operational Pilot Project (OPP) in which members of the scientific staff of BPT are testing out their research findings on farms in the Bogor District is now underway. I was involved in the preliminary meetings with DINAS Peternakan and the farmers, and then in distributing the animals and the money for the kandangs to the farmers.

My counterparts and I submitted a proposal to the protocol discussion meeting in BPT to routinely study the air temperature and humidity outside and inside the OPP kandangs. This proposal was approved and we wrote out a data collection routine and started our measurements in October. The measurements in October and November went satisfactorily, but in December only one-third of the data were collected as the psychrometer broke on our other field work and we had to transfer the instrument from Bogor.

In November I spent two weeks in West Timor, visiting the Australian-Indonesian Livestock Development Project at Besi Pae

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and attending a seminar on the Development of Semi-arid Ecosystems in Eastern Indonesia, supported by the Ford Foundation. There is a separate report of this tour. I also saw the site of the proposed new BPT Sub-Balai at Lilli in West Timor.

In December I spent three weeks in Ciburuy, Garut and Cirebon, collecting data on the second phase of our survey to study houses for sheep and goats. This work proceeded as described for the month of August. Despite the institute having previously approved the project, only half the required amount of subsistence money was available for my two counterparts, so Muchji alone came with me to Garut, and then Wening to Cirebon. We broke a thermometer while working in Garut, but managed to complete the work satisfactorily. We conducted farmers' meetings in each village to inform the farmers why we were crawling in and out of their kandangs carrying strange looking instruments, and to give them a chance to ask questions about any aspect of animal production.

I have agreed to help in the production of a film on small ruminants in West Java and the role of BPT in improving productivity. This is being organised by Dr John de Boer, and will be funded and given technical assistance from the U.S.A.

In an attempt to characterise the long-term climate of the Ciburuy, Garut and Cirebon areas where we are working, I visited the Meteorological Office in Jakarta to extract the relevant data. Despite the many ommissions we managed to get reasonably

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reliable 15 year averages of maximum and minimum air temperatures and rainfall for each month.

I have been involved in trying to analyse some of the many data obtained by BPT staff over the last five years, of the productivity of village sheep and goats. At present this data is on the computer, but is uncorrected, incomplete and not analysed. We need some basic measures of productivity for comparison with the environmental data we have collected in the field, but I am trying to go further than this and to extract as much useful information as possible from the data.

In November, my counterpart Wening, presented a paper on the effect of the environment on the physiology of sheep in West Java, to a conference on the improvement of small-holder farming, held at the University in Malang. This paper included some basic data from the first phase of our housing survey conducted in August. I helped her prepare this paper.

I have had two papers accepted for presentation at the Australian-Asian conference on Animal Production to be held in Korea in May 1985. These are (i) a general review of the principles of animal housing in the tropics, and (ii) some results from our survey of sheep and goat housing in West Java. I have also been asked to present a paper on the role of women in animal production, by Sri Wahyuni who is unable to attend the conference. I have been helping several other scientists (mostly nutritionists and breeders) to prepare papers in english for presentation at the conference in Korea.

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I have been encouraging my two counterparts to think about their future research plans. Wening has decided to conduct an experiment at the BPT Sub-Balai at Sungai Putih in North Sumatra, on the effects of grazing and stall-feeding on the performance of goats. She has written out a proposal for this experiment and it has been approved in a protocol discussion meeting. My other counterpart, Muchji, will probably undertake an experiment to study the effect of shearing on sheep performance in Bogor, but he has not managed to submit a proposal yet.

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Report of visit by Ruth M Gatenby to West Timor, 13th to 25th November 1984.

I departed on the 6 a.m.. flight from Jakarta accompanied by ten rabbits from the BPT Ciawi complex, and destined for life in Timor. After changing planes in Den Pasar we arrived in Kupang. The airline staff were good at handling the rabbits carefully and keeping their crates in the shade. Travellers taking animals to Timor should note that in addition to a police permit to allow the travel of persons and a quarentine certificate for the transfer of animals (both of which I had), a health certificate is also expected to be shown.

Livestock Development Project, Besi Pae

This project is based approximately 3 hours by road to the east of Kupang, to the south of Soe. The road from Soe to Besi Pae is constructed from large lumps of rock without any fine upper layer and is VERY bumpy. The LDP is funded jointly by Australia and Indonesia. There are at present six Australian scientists working there: Colin Piggin (director), John Brett (dams engineer), Simon Field (agronomist), Andrew (sociologist), Peter Philp (animal scientist) and Dick Willing (training officer). In addition, during my visit there were several scientists visiting from Australia including Ray Jones (leucaena), Simon Field (crops) and John Aldrick (land mapping). I spent four days with the project personnel and accompanied them in their routine work.

Unlike West Java, in the eastern parts of Indonesia there is a substantial dry season. The rainy season begins in December and the Besi Pae area was very dry and brown. although some rain had fallen on the coast near Kupang giving it a slightly green appearance.

The area in the project is generally hilly and the soils fall into two categories. On the upper parts of the hills is an alkaline marl, rather like limestone in appearance. This formation is known as viqueque. The upper layers of viqueque are relatively hard whereas the underlying layers are more easily eroded giving rise to steep scarps. The other main soil type in the area is bogonaro clay which is extremely difficult to work in the wet season. Because the viqueque is highly permeable to water, there is almost no surface water in the area. This fact has severely limited the utilisation of the land. In the past the area was mainly used by people outside the area who grazed their cattle here during the wet season only. There were few permanant residents in the area, and these had to walk several kilometers each day to the nearest water source.

Also in West Timor there are soils derived from coral and these have a striking red appearance. Most coral soils look like moonscapes because there are many large jagged lumps of coral which are dark brown on the outside, but which when broken are white inside.

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One of the main functions of the project is to increase the ability of the area to support people, and to this end dams are being built to give a year-round supply of water. Consequently the project is very highly regarded by the local inhabitants. So far twelve dams have been constructed and of these seven are successful but the remaining five are not, largely because they were built on the permeable viqueque marl and thus they leak. Fencing of the dams to protect them from trampling by cattle is essential. These dams provide water for cattle and people. Simon Field has demonstration plots near some of the dams to show the range of vegetables it is possible to grow using the dam water for irrigation in the dry season. There was considerable yellowing of the leaves of the vegetables (particularly noticeable in the maize) and this was thought to be due to zinc deficiency on the alkaline soil.

Leucaena was already grown in the area before the project arrived. In the cropping areas, it is usually grown in rows about 5 m apart. Maize is intecropped with a rotation of one year cropping followed by two or more years fallow. Experiments are being planned to determine the potential for this system: what is the optimum cropping interval and how should the leucaena be managed to give the best fertilising effect to the crop?

The animals in the project area are Bali cattle, pigs, goats and chickens. Bali cattle are distinctive because of their white backsides. The body colour is light brown in females and young males, but tends towards dark brown in older males. The productivity of the Bali cattle is generally low, and Peter Philp estimates that the calving rate is about 60% and the survival rate of calves to weaning is only 50%. Males are sold to other more favourable areas in West Timor (such as Amarasi) where they are fattened for slaughter. There is a considerable export trade of male cattle from Kupang to Java.

The main problems of cattle production outlined by Peter Philp appear to be

1. the condition of the cattle decreases substantially during the dry season. This causes mortality of the young cattle and results in seasonal breeding of the cows. The local varieties of leucaena lose their leaves in the dry season but imported cultivars from Australia can provide green fodder throughout the year. Other legumes are also being investigated.
2. flies worry the cattle throughout the year, and it is thought that they aggravate the low productivity in the dry season.
3. the number of bulls in the area is too low. The bull:cow ratio is estimated to be about 0.01, when 0.10 would be more suitable for small herds. One reason for the low percentage of bulls is the demand for male animals for fattening.
4. Bali cows often have poor mothering ability and frequently desert their calves in the wet season.
5. the individual farmers have a problem in marketing their animals. They must trek them a substantial distance to the nearest livestock market where they do not have a guaranteed sale. The traders know that the the farmers are unwilling to

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return home with animals unsold so that the bargaining is in favour of the traders and the price agreed is usually low. In order to ameliorate this situation Peter Philp has organised the villagers to build a cattle market near the project headquarters. This pasar will be in operation soon.

The pigs, goats and chickens are all small local types and are thought to have low productivity. A survey is being conducted in the project area to determine the productivity levels of cattle and goats. In West Timor there are no sheep (except in the Kecamatan of Kupang) or cattle of breeds other than Bali because these animals carry the fatal virus disease known as Malignant Catarrhal Fever to which Bali cattle are very susceptible.

There is a poultry project on the LDP which has birds imported from Surabaya but, despite vaccination, these are suffering high mortality.

In an attempt to determine the equitability of animal ownership and to find out which families should receive cattle on a loan scheme, Andrew the project sociologist was conducting interviews with every family in the project area. The interviews were long and complicated. For instance even family size was difficult to determine because children are not always reared in the family into which they are born.

The LDP headquarters has a library of literature relevant to the area. Much of this is informal literature, comprising reports which have not been published. A considerable amount of work was conducted by CIDA in 1975, aimed primarily at the water resources of the area but also investigating many other aspects. One volume is about the livestock resources.

Livestock production in the Amarasi area

On Saturday 17th November I visited the Amarasi area in south western Timor to see the systems of cattle fattening using leucaena. Male cattle are bought from markets at an age of perhaps two years or more. They are then kept intensively and fattened primarily on a diet of leucaena. A typical household has two cattle. They are tethered individually behind the family house, usually under a tree. The cattle are fed twice a day with leucaena cut and carried from the fields. The system appears to be almost ad libitum feeding. Typically the cattle are cared for by the wives and children (especially daughters) of the household, even though the farmer himself takes great pride in his large cattle. As the leucaena usually grows a considerable distance from the house, this is a very labour intensive exercise and each animal needs about 4 person hours per day.

Seminar on semi-arid ecosystems in eastern Indonesia

This seminar was held in the University of Nusa Cendana (UNDANA) in Kupang from 18th to 24th November. The aim of the seminar was to gather together scientists from many disciplines to discuss

case studies and to come up with recommendations and key questions which could be followed up by the University staff. It was initiated by Dr Gordon Conway from Imperial College in London (who had previously organised similar seminars in other parts of Indonesia) and was sponsored by the Ford Foundation.

The seminar comprised an opening ceremony by the Governor of Timor, presentations by indonesian scientists regarding the case studies and other projects, a presentation by Gordon Conway about the approach to be adopted in the seminar, discussions of the case studies, visits to the case study areas, evolution of key questions and recommendations and presentations of these to the Rector of the University and the Governor.

The four case studies were of the villages Oenesu, Too Baun, Silu and Tunua. The staff of UNDANA had prepared reports about each village, and I have copies of these. It is intended that reports are written concerning the findings of the seminar but, as far as I know, no positive action was taken to initiate this.

The key questions put before the Rector were
1. How much will the yield of the ladang and home garden crops increase if the manure from the stall-fed animals is spread as fertiliser?
2. Which varieties of mangoes and jackfruits with high market value could be introduced?
3. Would a change from individual responsibility for land use to some form of communal reponsibility help to conserve and utilise the area?
4. Would vaccination for village poultry be of economic benefit, and should this be accompanied by the introduction of improved breeds and better nutrition and management?
5. How can the marketing system for agricultural produce be improved?
6. What technology and management should be introduced to increase the carrying capacity of rangelands?
7. What is the cheapest and most effective method of soil and water conservation?
8. Which crops and livestock have the greatest potential for increasing the farmers' income?
9. How can farmers use their time more efficiently to increase productivity?
10. What sources of credit should be made available for farmers?

The recommendations were
1. There should be weekly and monthly weather forecasts.
2. Underground water should be identified and mapped.
3. There should be better contact between the extension services and the farmers.
4. Roads to the villages should be improved.

Ruth Gatenby

Ruth M Gatenby, 27th November 1984.

APPENDIX II

QUARTERLY ACTIVITY REPORTS FOR THE AARP/RMI SPECIALIST TEAM AT THE BANJARMASIN RESEARCH INSTITUTE FOR FOOD CROPS

Quarterly Activity Report by Dr. Kevitt Brown
Rice Breeder
October 1 - December 31, 1984

A. Activities

1. Consultations - included in general report

2. Travel

a.	Handil Manarap Expt. Station (BARIF)	:	24/11
b.	Belandean Expt. Station (BARIF)	:	8/12
c.	Binuang Expt. Station (BARIF)	:	1/12
d.	R & R —	:	18/10 - 28/10

3. Helped counterparts prepare the wet season nurseries including experimental plans, and seed lists. Aided in transplanting and laying out field experiments.

4. Wrote three papers with counterparts and submitted them for publication :

   a. Present State and Future Challenges of the BARIF Indonesian Swamp Rice Breeding Program. I. Tidal Swamps. K.D. Brown and S. Sulaiman, submitted to Indonesian Agriculture Research and Development Journal.

   b. Present State and Future Challenges of the BARIF Indonesian Swamp Rice Breeding Program. II. Deepwater Swamps. K.D. Brown and S. Sulaiman, submitted to Indonesian Agriculture Research and Development Journal.

   c. Evaluation of Upland Rice Testing Sites in Kalimantan. K.D. Brown and Sutami, submitted to Indonesian Journal of Crop Science.

5. Attended a three day conference in Banjarmasin concerning swamp development.

6. Sent seed to IRRI of best BARIF breeding lines and ordered IRRI nurseries for 1985.

7. Helped Ir. Suhaimi, MSc fill out TOEFL application, and applications for PhD abroad. Also wrote letters for Ir. Hidayat for training in seed technology at IRRI.

8. Helped Ir. Sutami, MSc write a paper for publication.

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9. Worked with Ir. Hidayat to improve seed storage system at BARIF. Developed an efficient seed germination test procedure.

10. Took of 1.5 days sick leave and 10 days R & R.

B. Plans for First Quarter, 1985

1. Finish work on two papers for publication by plant breeding staff.

2. Give training lectures.

3. Take data with counterparts in plant breeding experiments.

4. Give seminar on my 2 year's work at BARIF

5. Return to US after completion of my contract on 22 January.

C. Problems and Proposed Solutions

Nothing new to add in this category.

APPENDIX

Banjarmasin Research Institute for Food Crops
Applied Agricultural Research Project : (BARIF)

TRIP REPORT
LAPORAN PERJALANAN

This report must be typed or filled out neatly in longhand for all trips (field trips, meetings, congresses, etc), not exceeding 100–150 words.
Laporan ini harus diketik atau ditulis tangan dengan rapi dan berlaku untuk semua laporan (perjalanan dinas, rapat, kongres, dll.), tidak lebih dari 100–150 kata.

Name / Nama: Dr. Kevitt D. Brown

Department / Kelompok: Plant Breeding

Date of Departure / Tanggal berangkat: 24 November, 1984

Return / Tanggal kembali: 24 November, 1984

Principal Locations Visited / Tempat-tempat yang dikunjungi: Handil Manarap Experiment Station (BARIF)

Accompanied by / Pengikut: Ir. Suhaimi, MSc; Nurlaila, BSc; Ir. Fatima; Ir. Trisnawati

Purpose of trip / Maksud perjalanan: To layout Plant Breeding Experiments for transplanting.

Observations (factors requiring action, new items, etc.)
Hasil pengamatan (factor-factor yang memerlukan penanganan, hal-hal baru, dll.

The road to Handil Manarap station is much improved because of a local government project there. We could drive within a half km of the station.

Only one laborer was present at the station. We showed the technicians how to lay out the experimental blocks. Our experiment had to be placed in the same land where the seedbed had been. I explained this is not good practice since it increases CV. The land still is not level enough for proper research. Eventually a tractor must be used. Some rat fences were poorly constructed and some rat damage in the seedbed was observed.

APPENDIX

Banjarmasin Research Institute for Food Crops
Applied Agricultural Research Project : (BARIF)

TRIP REPORT
LAPORAN PERJALANAN

This report must be typed or filled out neatly in longhand for all trips (field trips, meetings, congresses, etc), not exceeding 100 – 150 words.
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Name / Nama: Dr. Kevitt D. Brown

Department / Kelompok: Plant Breeding

Date of Departure / Tanggal berangkat: 1 December, 1984

Return / Tanggal kembali: 1 December, 1984

Principal Locations Visited / Tempat-tempat yang dikunjungi: Binuang Experiment Station (BARIF)

Accompanied by / Pengikut: Ir. Dodot.

Purpose of trip / Maksud perjalanan: To supervise planting of the upland rice yield trial.

Observations (factors requiring action, new items, etc.)
Hasil pengamatan (factor-factor yang memerlukan penanganan, hal - hal baru, dll.

The new station manager seemed quite knowledgeable and capable. The experiment had been well laid out before our arrival. I suggested more careful control of the number of seeds/hill to avoid plot variability.

During our rest period between planting and fertilizing, the laborers completed the fertilization in the wrong manner. The technicians reassured me this would not happen again but it pointed out to me the danger of not having the researcher present even for a short time. Without care and quality, research is not possible.

The prefered method of fertilization is placement alongside the seed. The laborers just spread the fertilizer over the soil surface. This is very inefficient use of a basal fertilizer application of N and P.

APPENDIX

Banjarmasin Research Institute for Food Crops
Applied Agricultural Research Project : (BARIF)

TRIP REPORT
LAPORAN PERJALANAN

This report must be typed or filled out neatly in longhand for all trips (field trips, meetings, congresses, etc), not exceeding 100–150 words.
Laporan ini harus diketik atau ditulis tangan dengan rapi dan berlaku untuk semua laporan (perjalanan dinas, rapat, kongres, dll.), tidak lebih dari 100–150 kata.

Name / Nama: Dr. Kevitt D. Brown

Department / Kelompok: Plant Breeding

Date of Departure / Tanggal berangkat: 8 December, 1984

Return / Tanggal kembali: 8 December, 1984

Principal Locations Visited / Tempat-tempat yang dikunjungi: Belandean Experiment Station (BARIF)

Accompanied by / Pengikut: Ir. Suhaimi, MSc; Nurlaila, BSc; Ir. Arief; Ir. Trisnawati.

Purpose of trip / Maksud perjalanan: To layout plant breeding experiments.

Observations (factors requiring action, new items, etc.)
Hasil pengamatan (factor-factor yang memerlukan penanganan, hal-hal baru, dll.

The field water depth was about 25 cm when we arrived. The seedbeds were prepared by drawing mud from the canal and sowing the seed on top. Obviously the mud was "acidic" because in portions the seedling were burned and barely rooted. The farm manager than moved some of the breeding lines to the rice field where they grew well.

The result is that our trials have few seedlings and these are quite variable. We ordered reduction in size of plots and completed the layout of plots during our trip.

My assessment is that we will need to establish a permanent seedbed area in Belandean, perhaps a raised mound constructed of non-acid clay. Since mole cricket is also a problem, this may need to be controlled by chemicals in the seedbed.

BARIF Plant Breeding Department -- Plan of activities for the next 15 years

Program	Crop			
	Rice	Corn	Legumes	Root Crops
Tidal Swamp	C_I	C_{II}	C_{III}	S_I
	E_I	E_{II}	E_{II}	
	S_I	S_I	S_I	
Lebak Swamp	C_I	C_{II}	C_{III}	S_I
	E_I	E_{II}	E_{II}	
	S_I	S_I	S_I	
Upland	E_{II}	S_I	E_{II}	S_I
	S_I		S_I	
Rainfed	S_I	S_{II}	S_{II}	S_{III}

Activity :

C = crossing and early generations at BARIF
E = crossing outside and early generations at BARIF
S = advanced generation selection at BARIF

Period when activity begins :

I = Short term, to 1990
II = Intermediate term, to 1995
III = Long term, to 2000

Quarterly Activity Report by Dr. Bernardo Gabriel
Entomologist
October 1 - December 31, 1984

A. Activities

1. Trips - During this quarter a number of trip were made to the different experiment station of the Balittan to monitor the different research projects and pest situation in different localities. One trip was made to East Kalimantan to visit the Lempake Station. Corresponding trip report are enclosed :

10 October 1984	Trip to Benua Anyar, Maramahan Subdistrict, South Kalimantan
24 October 1984	Trio to Lempake, East Kalimantan
6-7 November 1984	Trip to Alabio, South Kalimantan
10 November 1984	Trip to Gambut, South Kalimantan
13 November 1984	Trip to Handil Manarap, South Kalimantan

2. Seminar - Workshop Attendend

7 November 1984	PPL meeting at Alabio regarding rat control.
27 - 29 November 1984	Temu Tugas Penelitian Penyaluran Teknologi Pasang Surut dan Lebak at Balittan Banjarmasin.

3. Continue Lecture on Pest Management to Research Staff of the Balittan.

4. Prepare second draft of the Master Plant for BARIF

5. Continue conduct of on-going research.

6. Continue collection of insects pests and weeds in swampy areas.

7. Submitted for publication - an Inventory of the Weeds in Tidal Swamp (In Indonesia) together Ms. Riga Megia (BIOTROPE Scinetist) as Senior Author and Arif Budiman (Staff, Balittan Banjarmasin)

8. Established Pest Monitoring and Surveilence activity for the different Balittan experiment stations. This includes insects, rats, diseases and weeds.

B. Problems

Lack of research facilities

C. Plant for First Quarter (January - March 1985)

1. Continue lecture series in Pest Management

2. Continue conduct of series

3. Submit papers for publication.

No.	:	TR -
To	:	AARP - GOI Project
From	:	Dr. Bernardo P. Gabriel, Department of Pest Management and Thomas M. Gula
Subject	:	Trip to Alabio
Accompanied by	:	Ir. Suhaimi Sulaeman, MSc; Ir. Badaruddin; Mr. Tairan Sarimin.
Date	:	6 - 7 November 1984

November 6, 1984

We first went to Dinas Pertanian at Amuntai to discuss problems on pest management on deepwater rice. When we arrived other personnels from BARIF already there namely ; Ir. Suhaimi Sulaeman, MSc, Ir. Badaruddin and Mr. Tairan Sarimin. They left early from Banjarmasin. In the afternoon we proceeded to Banyu Tajun Dalam where our rat experiment was located. In here we also made observations on insect pests and plant pathogens. Mr. Pahri the extension worker guided us during this afternoon trip.

There was a low incidence of rice stemborer damage as indicated by whitehead at the rat control experimental site. There were numerous predatory insects specially the staphylinid beetle Paederus fuscipes and the carabid beetle Ophionea sp. Leaf scald disease was also observed.

Other insect pests observed in the area were the squash beetle Aulacophora similis and Epilachna sp. on white gourd, Catochrysops cnejus on beans and palm weemils, Rhynchophorus schach on palmes including coconut.

November 7, 1984

We went to Dinas Pertanian again where we met Ir. Fauzi (Entomologist) our contact in the rat control project and Ir. Bahaidin from Balai Proteksi. The latter presented a research proposed for rat control to be conducted in Gambut, (See Gula's report below). Fater prolonged discussion on rat control at Dinas Pertanian we proceeded to PPL meeting in Alabio where

we discussed rat control with the extension workers. After the meeting with PPL in Alabio we proceeded to Tapus, Sungai Buluh and made further observations on pests in Area. Some insects and weeds were collected. Sampling of whitehead collected revealed two species of stemborer namely: the yellow rice stemborer Scirpophage incertulas and the striped rice stem borer Chilo suppressals. Larvae of Spodoptera litura were found feeding on the leave of Nelumbo Aucifera, a species of lotus commonly found in this lebak area. Various gramizuous weeds predominant in the area were also collected for identification.

Report from Thomas M. Gula

We set up a meeting for the following day at the PPL headquarter in Alabio, to discuss various aspects of rat control and population dynamics with the staff. After this meeting we visited the site of Balittan's rat control experiment in desa Banyu Tajun Dalam in the afternoon. We spoke with one of the field technicians responsible for bait placement and inspection, and received a copy of the data on bait consumption. The data have yet to be compiled, but preliminary observations at the field site indicate little rat damage. We recommended ending poison baiting once the rice has reached the heading stage, since at this point rats prefer developing rice grains over any type of poisoned bait.

The following day November 7, we first went to where we met with Ir. Bahaidin from the Balai Proteksi in Banjarbaru, who outlined the details of a rat control experiment planned for the next rice cropping season in Gambut. The purpose of this experiment is to compare the effectiveness of several different bait container placement locations, using the rodenticide Klerat RM. We offered several criticisms of the proposal, especially the fact that no control area was planned to be included in the experiment, making it impossible to draw any conclusions about the effectiveness of Klerat o· reducing rat damage and/or increasing rice yields.

Lates we met with the extension workers in Alabio. We discussed some of the basic characteristics of anticoagulant action and poison baiting techniques to control rat populations. Ir. Thamrin presented a discussion of how an anticoagulant such as Klerat works, how it

differs from acute poisons such as Temik and zinc phosphide, how Klerat differs from other so-called first generation anticoagulants such as Racumin, and the development of bait shyness with acute poisons. We stressed the importance of early use of rodenticides to control rat populations while they are still low, and before the preferred rice reaches a heading stage, as well as the relationship between the breeding cycle in rats and the development of the rice plants. Extension workers have already been told the farmers must be discouraged in their use of Temik to kill rats, a chemical never intended for use as a rodenticide; this follows a decision by the National Crop Protection Directorate.

Several technicians noted the difficulties in controlling rats in deep-water areas. During times of high water rats are said to seek shelter in and near houses. Large, uncultivated weedy areas near rice fields also offer food and shelter to rats, from where they may move to developing rice fields at harvest. We recommended research to learn more about movement patterns and population dynamics in deep-water areas, as well as studying the most effective types of baits and bait container location under flooded vs. non-flooded conditions.

Judul (Nursery) _____

Peneliti (Researcher) _____ No. Perc. (Exp. No.) _____

Lokasi (Location) _____ Musim (season) _____

Tgl. semai (date seeded) _____ Tgl. tanam (date planted) _____

Bila tanam langsung, tanggal berapa ? (date direct seeded) _____

Data Pengamatan (Data recording)

entry No.	Entry										
Y0	Pusitpari										
Y1	IR 23426-R-R-11.										
A	IR 11141-6-1-4.										
B	BR 911-B-5-4.										
C	IR 11288-B-B-118-1.										
Y2	Kerkah BY										
Y3	Epuli-KHA-MA										
Y4	IR 9288-B-B-B-252-1-B										
K_I	Kencana putih										
K_{II}	Kencana putih										
K_{III}	Kencana putih										

1983	1984	1985	1986	1987	1988	1989
Make Crosses						
Release Malakan	Release Kapuas	Deepwater Rice release	Acid tidal swamp rice release	Early maturing swamp rice release	Medium Deep water rice release	upland rice release
		Implement Facilities (equipment and research, etc) seed processing computer	Select from crosses			
Training						

Still no progress on secondary crops: should start 1985

Breeding program ~~[illegible]~~ requires continuity, progress is occurring but quality requires presence of expert

Few Breeding staff now and poorly trained

- 1 Msc now pregnant
- 3 Ir one just arrived another arrival 1 yr ago
- 2 Bsc
- 1 Msc expected to go for PhD 1985

No.	:	TR -
To	:	AARP - GOI Project
From	:	Dr. Bernardo P. Gabriel, Dept. Crop Protection Mr. Thomas Gula, Dept. Crop Protection
Subject	:	Trip to Lempake, East Kalimantan
Date	:	24 October - 28 October, 1984
Purpose	:	To visit the Lempake experiment in order to assess crop protection and plan for possible research on pest management in the area.
Accompanied by	:	Dr. H. Anwarhan, Mr. R.G. Manuelpillai, Ir. S. Raihan, Ir. S. Sulaiman, Ir. Mauliana, Ir. Muchlis, Ir. A. Basit, Ir. Smith Simatupang, Ir. M. Noor, Mr. Sudirman Umar and Mr. T. Gula.

Observation

Lempake is the only experiment station of BARIF in East Kalimantan. It is about 600 km from Banjarmasin and 17 km from Samarinda the capital of East Kalimantan. The land route from Tanjung, South Kalimantan to Penajam was 50% poor. From Balikpapan to Samarinda was about excellent. From Samarinda to Lempake was bad.

The station started operating only a year ago. It has about 10 ha with 1 ha of rainfed, rice field opened. About 80% is lowland rice field. It is not a tidal swamp area. The adjoining area however is flooded with water overflowing from the Mahakam river. Dr. Anwarhan proposed that the Balittan exchange a part of this flooded area which belongs to Dinas Pertanian with some of the rainfed area now under the Balittan. This will then be within BARIF's assigned mandate of developing food crops in swampy areas.

At present, the station has two buildings given by the local government. Later it is expected to have two more buildings, a storage area and five houses for the personnels.

The station is headed by Mr. Kasmani formerly the station leader of Pleihari. He has five other personnels helping him in the station who are mostly SMP graduates.

Crop planted in the station other than rice are soybeans, peanuts mungbean and corn.

Crop Protection Problems

According to the personnel at the station the more infortant pests are rats, seedling fly and rice stem borer. Some rice disease are also present.

Our observation in the field on rice (Mahakam and IR42 varieties) a month old - showed rice stem borer damage, white leaf hopper and Helminthosporium leaf spot. Some rice plants showed orange leaf symptom.

Weeds observed were sedges (Cyperus sp.), Salvinia molesta, Echinochloa colona, Hyptis rhomboides, unidentified aquatic weed, and Panicum repens. Some of the unknown weeds were collected for identification.

Furadan 3G were applied for insect control followed by Sevin at the later stage of the rice plant.

Report of Thomas Gula on Rats

A staff member named several insect pests and rats as problems, with rats being most severe. The large areas of surrounding forest and patches of natural swamp vegetation provide nesting areas and alternate food supplied for rats; They make any attempts at control more difficult. When questioned about attempts to control rats, Mr. Kasmani replied that staff members had used Klerat, but that they discontinued use when "the rats continued to damage the rice". They then switched to using Temik, a potent insecticide not developed as a rat poison. When questioned about how they used the Klerat, we learned that it was applied on 2 consecutive days about 1 month after transplanting, in 20 bamboo bait stations per hectare. This is already rather late - baiting should begin 1-2 weeks after transplanting. When after 2 days of Klerat baiting rats were still observed to be damaging rice, Klerat application was abandoned. This was to be expected, since

Klerat is a slow-acting poison which takes about 6 days to kill a rat. We explained the mode of action of Klerat, and stressed the need to (a) use it soon after planting to prevent rat populations from rapidly building up, and (b) to continue to use it even though no dead rats are seen or some rat damage continued for 2-4 days after poison baiting.

As long as forested areas remain nearby to experimental fields, rat damage will likely continue to be a problem at Lempake. The use of rat fences to protect valuable experiments will probably be necessary.

APPENDIX

Banjarmasin Research Institute for Food Crops
Applied Agricultural Research Project : (BARIF)

TRIP REPORT
LAPORAN PERJALANAN

This report must be typed or filled out neatly in longhand for all trips (field trips, meetings, congresses, etc), not exceeding 100 – 150 words.
Laporan ini harus diketik atau ditulis tangan dengan rapi dan berlaku untuk semua laporan (perjalanan dinas, rapat, kongres, dll.), tidak lebih dari 100 – 150 kata.

Name / Nama: Dr. Bernardo P. Gabriel

Department / Kelompok: Crop Protection

Date of Departure / Tanggal berangkat: 10 November 1984

Return / Tanggal kembali: 10 November 1984

Principal Locations Visited / Tempat-tempat yang dikunjungi: Gambut

Accompanied by / Pengikut: Ir. Thamrin and Ir. Muchlis

Purpose of trip / Maksud perjalanan: To arrange studies on population dynamics of pest of rice with PPL to be conducted in farmers' field and collect insects and weeds.

Observations (factors requiring action, new items, etc.)
Hasil pengamatan (factor-factor yang memerlukan penanganan, hal - hal baru, dll.

Meet with PPL personnels headed by Mr. Zain. PPL is amenable to helping Balittan find a farmers' field to conduct population dynamics studies. We are interested in conducting studies in areas where application of chemical insecticides were done and if possible for comparison in areas where there was no pesticide applied. According to Mr. Zain, it would be difficult to find an area where no spraying was done since most of the farmers are planting improved varieties. These varieties have to be protected with pesticides. However, in some remote areas we may find places where no spraying is done.

We need at least one half to one hectare of observation area.

After the meeting we collected the following predominant weeds in this tidal swamp areas. Eleocharis sp, Fimbristylis sp, and Melastoma affine. Other weeds abundant in the area were also noted.

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Name / Nama: Dr. Bernardo P. Gabriel

Department / Kelompok: Crop Protection

Date of Departure / Tanggal berangkat: 13 November 1984

Return / Tanggal kembali: 13 November 1984

Principal Locations Visited / Tempat-tempat yang dikunjungi: Handil Manarap

Accompanied by / Pengikut: Ir. Syaiful Asyikin and Ir. Badaruddin.

Purpose of trip / Maksud perjalanan: To follow up the preparation of forthcoming pest management experiment in the station.

Observations (factors requiring action, new items, etc.)
Hasil pengamatan (factor-factor yang memerlukan pe..anganan, hal - hal baru, dll.

Preparation of two in coming experiments were underway with the planting of seeds two weeks before. The experiments are on population dynamics studies, and economic threshold level with the Agroeconomics Department.

Observations on rice seedlings to be used for population dynamics studies and where a portion of the seedbed was sprayed with Dimecron while another portion was not showed an abundance of insects in the unsprayed portion. Insects include planthopper, green leafhopper and seedling fly. Some seedlings were destroyed by either seedling fly or possibly mole cricket. Roots seem to be cut and the seedlings were drying up. This damage was observed in both sprayed and unsprayed part of the seedbed. Mahakam variety is used.

Farmers seedbed were also observed and there was one case where a heavy attack of rice blast was found.

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In the fallow fields where rice stalk have been left to decay, the most predominant weeds noted were Sphaeranthus africanus, Cyperus spp., Polygonum spp., Ludwigia hyssopifolia, and Hedyiotes corymbosa.

Rats were reported to destroy some seedbeds. Rat holes were observed on the dikes.

Quarterly Activity Report by R.G. Manuelpillai
Soil Scientist
October 1 - December 31, 1984

I. Activities

1. Assisted the Agronomy and Soils Researchers at BARIF, in the planning and installation of the wet season 1984 experiments, with special attention paid on the experiments disigned for the site at Unit Tatas.

2. Assisted Ir. Dharwati, Research Officer, Agronomy in the installation of a pot experiment under green house conditions with isolates P, lime and micronutrients grown with a crop of rice, cultivar IR42 on a potential acid sulfate soil and managed under submerged conditions. Intensive crop monitoring is programmed to gain specific characteristics of the soil and plant behavior.
Also, another pot trial is ready for planting with a crop of maize, and isolates as P source and managed with the percent soil moisture maintained at field capacity. The delay is with Ir. Rizlan, who is under medical care and is replaced by Ir. Sabaruddin H.

4. Assisted Ir. Mauliana Damanik, Head, Agronomy Division in presenting the paper "A resume of 'palawija' (cereals, pulses and root) crop responses to soil amendments in the soils associated with the swamps", at the Meeting on the 'Transfer of agrotechnology on swamps and deep water ponds', held at BARIF with the chairperson Ir. Dady Gandu Sukarya, Director of Extension for Food Crops.

5. A Manual titled "Procedure, guidelines and data collection for Rice Based Experiments at BARIF' is ready for circulation.

6. Assisted the Division of Plant Breeding at BARIF by providing data on the soil chemical analysis and a likely catagory of the Great Group or family based on Soil Taxonomy of the BARIF experimental sites. This valuable information will assist the Breeders in a meaningful interpretation and transfer of information of their findings.

7. On-the-job-training

Ir. Khairil Anwar and Mohammad Noor are being trained further in the art of characterisation of the soil pedon by examining, describing and drawing soil samples from the horizons for chemical and mechanical measurements, at the sites Belandean and Tapus.
Ir. Achmadi Djamberi, Research Office, Agronomy was trained in the laboratory. In the initial stages Achmadi showed a very keen interest, but with time he changed and lost interest, probably financial reasons which factor is beyond our control.

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8. Plant and Soils Laboratory -- To-date a total of 50 sets of soil chemical measurements for pH, Ec, available P, organic matter, CEC, exchangeable Ca, Na, K, Mg, Al and H, and N have been completed. The laboratory staff are presently engaged in analysing soil samples on a request from Ir. Wiganda, Graduate Assistant, University of Hawaii presently conducting agronomic trials at K.P. Binuang on rice crop for his PhD dissertation. Though the progress of analytical measurements appears to be good, it could be better, if attractive incentives are provided.
A cardex system for inventorising the laboratory equipment, glassware, and chemical stocks was introduced, with a minimum of expenses.
The assitance of Ir. Nuttirtyani in completing this exercise is appreciated.

9. Training Abroad

Ir. Muhrizal Sarwani is presently at NifTal where he will undergo a 3 weeks training in rhizobium and continue working on a special program for a further 3 months. Prior to his departure a 2 week training was organised under Dr. Susono, BNI Bogor -- Assisted in Muhrizals acceptance and the training programs there off.

II. Consultations and Meetings

1.	October 31, 1984 :	Participated actively in the seminar presented to the staff and final year students, Faculty of Biology UNLAM, on the resume of research activities and findings in the field of Agronomy and soils and later a guided tour thru' the Plant and Soil Laboratory at BARIF.
2.	November 7, 1984 :	Participated in the talk presented by Dr. Paul Stapleton, Editor, Indonesian Journal of Soil Science. Discussions followed with Paul, David Hills, Information specialist, AARD, and Ms. Silvia on problems and research activities at BARIF. David carried 10 slides from my collection for publication.
3.	November 12, 1984 :	Brief discusions with the Prof. Dr. Ir. Gunawan Satari, Director General AARD, where emphasis was stressed an action required by the Chief, in improving the moral of the young researchers, with financial renumerations as one form.
4.	November27-29, 1984 :	Participated in the meeting on the Transfer of agro-technology associated with the swamp and ponds, and briefed the members present on the art of

managing these soils in relation to their chemical caracteristic and the agronomic findings to date. The chairperson expressed his graditute and awaits more information on the art of managing these soils, in the near future.

5. December 3, 1984 : Mr. Carl Fritz and Ms. Anik, were guided thru' the Plant and Soils Laboratory and later thru' the green house. Carl was pleased to see the progress with the limited assistance available

6. December 11-12, '84 : Dr. Sudasrip, Project Leader, AARP and Dr. W. Collier, Chief of Party, RMI were briefed on the problems that limit good data collection and the progress of research. A brief note on the milestones achieved and investigation planned for the years ahead was handed to Bill.

III. Proposed plan of work -- for the first quarter 1985

1. To continue monitoring the ongoing wet season agro-management field experiments at the BARIF experimental sites.

2. To install the green house screening experiment on the P source with a crop of maize and monitor its performance.

3. Standardise Laboratory techniques for measuring soil mechanical properties and chemical measurements on water samples.

4. To conduct hydrology measurement studies under a polder system of water management at Unit Tatas.

5. To plan and design a geostatistic survey and map the regional variation of the top soil, in an area covered by swamps.

6. Continue to assist the BARIF Researchers in the interpretation of soil/agronomic data with the assistance of the analysis of variance and regressions.

7. To plan and design a set of experiments -- fields, pot and laboratory for the proposed Seminar in June 1985.

APPENDIX

Banjarmasin Research Institute for Food Crops
Applied Agricultural Research Project : (BARIF)

TRIP REPORT
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Name / Nama: R.G. Manuelpillai

Department / Kelompok: Agronomy & Soils

Date of Departure / Tanggal berangkat: October 24, 1984

Return / Tanggal kembali: October 28, 1984

Principal Locations Visited / Tempat-tempat yang dikunjungi: K.P. Lempake, East Kalimantan

Accompanied by / Pengikut : Dr. H. Anwarhan, Director, Ir. Raihan, Project Leader, Ir. Mauliana and a researcher representing each Department at BARIF, along with Dr. Bernado Gabriel, and Tom Gula.

Purpose of trip / Maksud perjalanan :

i. Inspection visit to newly acquired experimental site at Lempake, Samarinda, East Kalimantan.
ii. To monitor the progress of the on-going rice multiplication trial with cultivars Mahakam, IR42 and IR36.
iii. To draw soil auger samples, examine and demarcated the horizons and describe, to a depth of 1 meter, and draw samples for analytical studies.

Observations and Experiences :

1. Travel to Lempake :

To reach Lempake site by road from Banjarmasin, we had to cover 600 km by land, and with two ferry crossings. The distance from Banjarmasin to Panajam was around 400 km and by ferry to Balikpapan, the ride takes 30 minutes. The ferry is owned and serviced by Pertamina, thus BARIF gets lower priority for use of the ferry services, this causes undue delays. From Balikpapan to Seberang Samarinda is around 190 km and by ferry to Samarinda, the ride takes around 20 minutes, and from Samarinda to Lempake is around 15 km -- 11 km on asphalt surfaced road and 4 km on earthen road. The earthen road is badly maintained and could cause problems like skidding and subsidence, during the wet months. However, the Provincial Government is planning to build an asphalt surfaced road in the mear future.

2. Site Area

The provincial Governer has allocated 10 hectares of land to BARIF for experimental purposes of which 8 ha are in the low lying areas, subject to flooded conditions for nearly 6 months of the year, and 2 ha on high ground where two houses have been constructed, also donated by the Governer's Office. Under a US/AID Grant Agreement, it is proposed to construct two buildings, housing the seed drying and seed processing chambers.

The site is presently managed by a Farm Manager, Mr. Kasmani, an SMPA Agricultural Diploma holder with nearly 20 years of experience and supported by three young SPMA diploma holders. The Farm Manager is residing 4 km away from the site area, with his family.

3. Site location and climatic data

Geographically the site is located at 00°28' latitude S of the equator and 117°.000 longitude E, at an elevation of 10 meters above mean sea level. The climatic data monitored at the Samarinda Weather Station, during the years 1904 to 1980 measured a mean annual precipitation of 1964 mm, with the lowest fainfall of 110 mm received in August and a maximum rainfall of 240 mm received in December. The rainfall distribution suggests that crops can be grown throughout the year. The mean air temperature measured 26.8°C, with a maximum of 30°C and a minimum of 24°C. The relative humidity measured 85.7, with a minimum of 94.8% and a maximum of 70.1%. The mean wind speed recorded 11.7 km/hr and mean monthly duration of sunshine read 40.9% (Lembaga Meteorologi dan Geofisika, Jakarta, 1981).

4. Soil Characteristics

Four surface 0-15 cm soil bore samples were examined, along with a bore (8 cm diameter) sample drawn to a depth of 1 meter at representative area in the field were examined and described and field pH measurements made by a potable potentiometer and spot tests for Ca, and Mn with 10% HCl and H_2O_2 respectively. The soil is likely to be grouped under the soil family, clayey, isohyperthermic, Tropofluents, based on Soil Taxonomy. The up-land soils in the vicinity will probably belong to the great group Red yellow podsol or Latasol, pH descreasing with depth. The pH of the water measured 5.2, indicating that the source of water appears to be good. Tests for calcium proved negative, while Mn was present in all the horizons, indicating that the surface and subsurface of the soil is a reduced state. The soil texture was clayie, and it's structure plastic increasing with depths. The soil conditions suggests that the soil is suitable for a rice based cropping system, the mean air temperatures and the solar radition also support this cropping system.

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5. The performance of the on-going experiments

A seed multiplication trial with rice cultivars Mahakam, IR36 and IR42 have been installed by Ir. Ida Herawati, with a plant spacing of 30 x 30 cm, and with application of 90 km N, and 90 kg P_5O_5/ha. The nursery planted commenced on August 11, 1984 and transplanted commencing on September 19, 1984. As a prevention agains insect damage the Farm Manager has springled Furadan after 3 days of transplanting, and poison baits for control of rats. Selvin is also sprayed on a weekly basis, as a prevention against seed fly, stem borer and leaf hopper.

The performance of the the cultivars is good, except that Mahakam is performing better than the rest. The tillering appears to be good, recording around 25 to 30 tillers/hill. All cultivars are showing toxic effects due to Fe, but not serious as indicated by the rust like red lessions on the leaf blade, the dying of the older, leaves from the tip downwards. Al toxocity symptoms are not prominent, at this stage of plant growth.

6. Short commings observed

i. The rice cultivated area is open, but should be well protected with the construction of galvanised-chicken wire fence -- 30 cm of galvanised sheet and 50 cm of chicken wire, and reinforced with jungle poles erected 2 meters apart.

ii. The Farm Manager should be instructed to collect phenological data, height measurements, tiller counts, flowering dates, panicle counts, grain weights etc.

7. Recommendations

In consideration to the soil factors, climatic factors and a lack of close supervision due to the distance, the following recommendation are suggested.

i. The site be used exclusively for rice seed multiplication trials.

ii. Priority to the cultivation of early maturing, short statured photoperiod sensitive, proven improved rice cultivars.

iii. Cultivation of 3 crops of rice per year.

iv. Cultivation of rice followed by 'Palawije' crops be also considered if necessary.

v. The University of Staff and students be invited to supervise and record data, and guided by the Research Staff, at BARIF. As suggested by Dr. Anwarhan, Director,

Memo to : Dr. W. Collier
Chief of Party

From : R.G. Manuelpillai
Soil Scientist

Milestone achievements in the year 1984 :

i. Established a model experimental site at Unit Tatas

ii. Established a Plant and Soil Laboratory at BARIF, capable of analysing soil, plant and water samples, with a high degree of accuracy, USDA and Internationaly accepted methods.

iii. Installed agronomic experiments in the dry season 1984, and responses to N, P and lime effects identified for crops maize, soybean, cowpea, and mung bean. Also a response to inoculation with native rhizobia, collected locally.

iv. Fifty percent of the work on site characterisation has been completed for Unit Tatas, Belandean and Tapus

v. Established green house experiment to study the effect of P and lime on crop rice maize -- in progress

vi. Constructed a polder at Unit Tatas for water management studies.

Proposed investigations on potential acid sulfate & peat soils for year ahead :

i. Short and long term studies on Soil - Plant - Water systems.

ii. High intensive soil mapping (5 years)

iii. To study the amelioration of acid sulfate soils by the addition of small amounts of lime (3 years)

iv. The effect of inorganic fertilizer N, P and lime in crop responses (2 years)

v. Varietal adaptability studies to low, medium and optimum inputs of inorganic fertilizer (2-5 years)

vi. To study the redox (oxidation/reduction) processes index submerged conditions (2 years)

vii. To plan, design and study water management on a water shed or polder system (3-5 years)

viii. To study infiltration rates (hydraulic conductivity, permeability, porisity) measured under field conditions (3 years)

ix. Cropping system research (5 years)

x. Conduct a geo-statistical survey on the lands under swamps in South Kalimantan (2 years)

Quarterly Activity Report by Greta A. Watson
Social Scientist/Agroeconomist
October 1 - December 31, 1984

I. Activities

A. Consultations

1.	2 and 25 October	Ms. Krisnawati Suryanata. East-West Center Environment and Policy Institute. Agro-ecosystems research.
2.	22-24 November	Bogor. Dr. William L. Collier, AARP Head of Party. Mr. Moestadjab, AARP, AID.

B. Travel

1.	10 October	Marabahan indirect tidal swamp South Kalimantan. Research on agroeconomic aspects and effects BIMAS, INMAS and INSUS rice improvement programs.
2.	15, 17 October	Pemajatan village, rainfed swamp South Kalimantan. Same as above. Group farmer interview with women farmers.
3.	9-10 November	Sumber Mulia village, upland site, Pleihari district, South Kalimantan. Agroeconomic aspects of tuber crop cultivation.
4.	12 November	Pabahanan village, upland site, Pleihari district, South Kalimantan. Same as above.
5.	25 Nov - 31 Dec.	Leave of absense and R & R/ vacation period.

C. Research Institute Activities : Agroeconomic Activities

1. Reviewed draft of BARIF Master Plan. Revised and expanded socioeconomic and agroeconomic sections in introduction and research sections. Wrote additional section on swampland flora.

2. With agroeconomics staff, wrote titles, justification and descriptions of 16 proposed units of research. This will be the basis for selection of 5-7 research units in 1985/86.

3. Commented an and editted an article by K.D. Brown and S. Sulaiman on rice breeding for monotonous swamp areas.

4. Aided in the preparation of a proposal for agroecosystems research in lebak areas of South Kalimantan.

5. Consulted on the development of agroeconomics questionnaires concerning a root crops survey and the applicability of government programs to rice culture in coastal swamps.

6. Continue aid in tabulation and analysis of current agroeconomics research.

7. Consultations with Ir. Eddy Purwanto an the agroeconomics of rat control.

D. Other BARIF Activities

1. Work report on women's farming activities in Pamajatan village, South Kalimantan.

2. Work report on lebak farming systems in South Sumatra.

3. Collection and description of 3 local rice varieties. Distribution to BARIF, BORIF, and IRRI.

E. Training

1. Ir. Eddy Purwanto and Ir. Abdul Basit will attend a training course in agroeconomics sponsored by LITBANG Pertanian, Bogor, from 1 Dec. 1984 - 28 Feb. 1985.

2. Presently working to obtain an overseas scholarship for master's training in agroeconomics for Ir. Abdul Basit, and encouraging all agroeconomic researcher training.

II. Plans for First Quarter, January - March 1985

A. Agroeconomic Department Research

1. Writeup of BARIF agroeconomic research

2. Analysis and writeup of current agroeconomic research

3. Preparation of two agroeconomic department papers for publication :

   a. Lebak Farming Systems in South Kalimantan

   b. Improvement of Agricultural Technologies for Swampy Lands : An Agroeconomic Perspective.

4. Continue research on transfer of technology for effective rat control.

B. Help edit papers for publication in BARIF Journal.

III. Comments and Suggestions

A. Research organization and activities have considerably improved in the agroeconomics department. Further training is needed in research analysis and writeup, and honing down of questionnaires. This will be carried out in the next quarter.

B. It may be valuable to include Kota Baru district, South Kalimantan and similar outlying swampy areas in Central Kalimantan in future BARIF research. This will provide additional and possibly unique information on other farming systems in these areas.

No. : WR-

To : AARP-GOI Project

From : Greta A. Watson, Agroeconomic Consultant

Subject : Three local rice species grown in coastal and/or tidally influenced swampland in South Kalimantan : collection and description.

Date : 23 October 1984

Purpose : To support BARIF, BORIF and IRRI's continuing collection and analysis of viable local swamp rice species. To communicate farmer perceptions of rice plant characteristics, including benefits and deficits, regarding socio-economic and environmental factors.

Description

I visited Banua Anyar village, Marabahan subdistrict and Pemajatan village, Gambut subdistrict, South Kalimantan, on October 10 and October 17-18 respectively. This was in connection with BARIF agroeconomic surveys concurrently being carried out within these swampy tidal and tidally influenced regions. During the course of group farmer interviews, both male and female farmers discussed attributes of various rice varieties grown in the area. I had the opportunity of collecting three local rice varieties at this time : Bayar Palas, Bayar Pahit, and Banih Bogor. Their characteristics as perceived by farmers are described below.

Bayar Pahit. This variety was planted in both villages, and throughout other areas of coastal swampland along the Barito River, and extending into some lebak regions. The variety has a 10-12 month growing period under a seedbed - two transplant - final plant system[1]. The length of the growing period is related to the time the plant is maintained in each transplant stage and the water level in the field during the cropping season[2]. Seedbeds were established or being sown in both villages at

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[1] This system is commonly used in swampy areas which have high water level during the cropping season. It is done in order to reduce mortality from submergence or excess flooding : as seedlings and young rice plants elongate, they are planted in areas with progressively deeper water levels.

[2] Bayar varieties are generally photoperiod sensitive. This may also shorten or prolong maturation.

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the time of the survey. Farmers in these villages harvest in August or September. Villages in other regions may seed and harvest at a later or earlier date. The height of Bayar Pahit ranges from 130-170 cm, depending on the fertility of the soil. Normal yields range from 1750-2500 kg/ha unhusked.

Farmers noted that Bayar Pahit rice has two characteristics which make it good to grow. Relatively speaking, the rice is subject to less severe rat attack than other slow or quick maturing traditional varieties. Farmers assert that the rice has bitter (pahit) tillers and young leaves which rats find unappetizing. They mentioned that the rice grain husks are also thick, to that rice bugs cannot penetrate them easily.

Bayar Palas. Bayar Palas (so called because the reddish gold hull is similar in color to nutmeg) has the same length of maturity (10-12 months) height, and methods of transplanting as Bayar Pahit. Yield is also similar, but tends to be lower in the case of severe rat or rice bug attack. Both Bayar Palas and Bayar Pahit have been grown for generations in the swampy regions of South Kalimantan.

Banih Bogor. This seed was obtained only in Pemajatan village. Banih Bogor has a 10½ month average growing period, but may take slightly longer in deeper water areas. It is planted using the seeding-two transplant-plant method. Grains are large and light wheat colored. The height ranges from 120 to about 150 cm. Some farmers prefer it because it has a high average yield (2 - 2,750 kg/ha). However, the variety has a number of drawbacks. It is highly suseptible to panicle sterility if during the flowering period, it is subject to strong east monsoon winds[3]. Women wage laborers in the area mentioned two economic drawbacks for them due to Banih Bogor phenotypic characteristics. First, the stem of the panicle is narrow in diameter, making them harder to cut with the finger knife (rangaman). Second, the rice hulls are sometimes awned. This can hurt fingers at harvest and feet during threshing. It also means that there is greater bulk but lesser weight when rice fills a harvest basket (lanjung, cupikan or hambinan). In the case of both wage harvesters and rice field owner-operators, they must dump their load more frequently and make more trips

[3]Farmers say that Bayar Pahit and Bayar Palas are less suseptible to panicle sterility during flowering. No specific reason was provided for these assertions. The east monsoon winds are particularly strong: I have measured gusts of up to 22 km/hr.

to the edge of the field.

The name, Banih Bogor (rice of Bogor) suggests that the rice originated in Bogor, Java. There is no local variety with a 10½ month growing period from that area, but the variety may be one of the rices which was tested at BORIF (Bogor Central Research Institute for Food Crops) in the last few years; possibly an improved Siyam Variety. The farmers we spoke to said that the rice had been grown for 5 years in the village. They did not know its origin, but also surmised it was Bogor.

The above description of these rices provides some general information on rice variety characteristics. More importantly, it reveal farmer-based preferences for specific phenotypic factors in terms of both social and biophysical environmental factors.

No.	:	WR -
To	:	AARP - GOI Project
From	:	Greta A. Watson, Agroeconomic Consultant
Subject	:	Group farmer meeting of women farmers, Pemajatan village, Gambut subdistrict, South Kalimantan
Date	:	17 - 18 October 1984
Accompanied by	:	Ir. Noorginayuwati, Ir. Abdul Basit, Ir. Eddy Purwanto, Ir. Nurlaila
Purpose	:	To assess women's role in Pemajatan village agriculture
Summary	:	The women's group (PKK) of neighborhood #21 and #19 Pemajatan village, Gambut sub-district, South Kalimantan were questioned concerning their farming practices in the swampland area. The interview provided insight concerning the social organization of agriculture, income opportunities for women as paid laborers in rice farming and ancillary activities. Women farmers also discussed rice variety characteristics in terms of social and environmental constraints.

Description

Pemajatan Village, located 13 km. east of Banjarmasin is a moderately deepwater (50 - 100 cm maximum water level) swampland. The area is rainfed, but there may be 'type D' underground tidal influence. According to Haji Noordaya; who was an original settler, the first 4 farming families came to Pemajatan in the mid-1930's. At that time peats within the area were 30 cm or more. The forested area on the southern side of the village was burned, and rubber and rambutan were planted on this initially higher ground. After a few years, the northern side of the settlement was cleared. Here pineapple was initially planted, then rice. Original harvest were high (3-3,5 tons/ha .), but over time yields have dropped to 1.8 - 2.0 tons/ha. average. Haji Noordaya attributed this to land subsidence and loss of overlying peat. This could have been due, however, the flooding which generally becomes more common with the removal of forest which retains water. This situation (and possibly, fall in the price of ruber) lead to a gradual conversion of rubber plantations to rice field.

Village population grew considerably during the late 1940's through 1960's. The households opened forest further and further inland. Today the area from Pemajatan extends about 15 km to the Martapura River and is comprised of various village. Most settlers came from the Hulu Sungai area. Rice is the only major crop. Vegetables and fruit trees are planted on higher ground near the roadside. At present there is no discernible peaty soil layer.

The women's group in RT21 of Pemajatan village provided considerable information on farming systems environment and activities, including labor, rice varieties, and vegetable cropping.

Rice farming: Labor. Women noted that they transplant, plant and weed rice more than men; slash weeds and ditch irrigation canals less frequently. Whereas all of the 20 women farmers could and did slash weeds, they noted that men had more stamina in this activity. They pointed out that transplanting and planting were carried out in fields that were simultaneously being slashed, and that this resulted in a division of labor. For jobs such as construction of seedbeds and harvest, men and women worked together. Weeding tended to be womens' labor.

The women organized themselves into mutual aid (gorong-royong) groups of 5 - 10 for planting and weeding. They noted that work efficiency per woman increased under these circumstances (50% - 100% in planting).

In Pemajatan, rice cultivation provided women with wage labor opportunities. This is because much of the rice land is owned in large (> 2 ha.) lots by persons residing outside of the village, who must hire labor. Women primarily work planting, weeding or harvesting rice in these circumstances. Wages may be paid by the area, per day or half day. Rp. 700,- per borongan (1/17 ha) or about US $ 24.50 per hectare is the standard rate for planting. Weeding is a ½ day activity (gawian baesokan) from 7 - 11 AM and the rate is Rp. 600, regardless of area weeded. This leaves time for women to work at other activities and/or in their own fields. At harvest, harvesters receive Rp. 200[1] per bilek (10 kg) of unhusked rice which they must also thresh. They also receive a midday meal. They work from 7 AM - 4 PM on a typical day (gawian harian).

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[1]This is approximately 1/9 share using the standard cost at harvest (Rp 1750/bilek).

Many women mentioned that wage labor to weeding is sometimes essential to maintain family income. This is because weeding occurs after final planting and prior to harvest. This period (musim peceklik) is one where most families have exhausted their own rice supplies and rice and other of essentials (sugar, fish, tea) must be reduced or curtailed. For weeding outside village labor is almost never employed.

Planting, but primarily harvest labor generally require in-village as well as migrant labor. Except in cases where land is $1^1/_3$ ha or more (>50 borongan), the standard family, including 2-3 adults can carry out planting themselves. Workers come from the Pleihari and Hulu Sungai upriver region of South Kalimantan to harvest in August - September (Pemajatan villagers may reciprocate labor at harvest, too). Workers (usually having a family connection) are housed with the families who employ them. The rangaman of finger knife is used to harvest. The average person can harvest and thresh[2] 50-60 kg (5-6 bilek) a day.

Rice varieties and harvesting. Women pointed out that the income per day from harvesting was directly linked to the amount of rice harvested. However, they also noted that the amount of rice to be harvested not only depended on individual capability, but on rice panicle density, rice varietal characteristics, threshing ease, and other environmental conditions. They tried to choose an area to harvest for wage labor according to these conditions. They mentioned that

- If the yield/ha. is low, less rice can be gathered per unit of time : you can't harvest as much per rice plant. You also have to harvest a larger area and travel more to get to rice. Therefore, the denser and higher yielding the rice, the better.
- A long panicle stalk makes harvesting easier. Incomplete panicle exertion or short panicled rice is more difficult, since all rices must be harvested individually.
- If the panicle stalk is thick, it is easier to hold and to cut with the finger knife. Narrow stalks are hard to gather, hold and cut. Bayar Palas variety has this characteristic (tangkainya ganal, gampang mangatam).
- Awned rice is difficult to thresh by foot as are non-shattering varieties. Banih Bogor awned rice, although it is easy to harvest is difficult to thresh, takes time and hurts feet.
- If rice grains are prone to sterility, the panicle weight and threshed grain volume will be low. This means more work for less yield.

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[2]Threshing is usually carried out every other day, since payment is usually per 10 bilek.

Rice varieties and sterility. One of the problems women mentioned was the strong monsoonal winds that occur during the rice flowering period in July through August. This can disrupt pollination and result in sterility of grains. Lemo is one rice variety which is less affected by this situation, while Pandak variety is suseptible. Dr. Kevitt Brown, BARIF Breeding consultant notes that some rice varieties can shed pollen before the rice flowers, which can insure self pollination even under windy conditions. This may be the case with Lemo.

Problems with double-cropping rice. IR42 had been introduced into the village to promote double cropping[3]. Farmers asserted however, that it was not suitable for Pemajatan village. Women said that IR42's growing season was too long. This made a labor bottleneck. At this time, standing water in the field was often high, making it impossible to transplant the local variety. Not all farmers planted IR42, and rats severely attacked the patchy crops. Since water levels differed throughout fields, farmers could not acheive synchronous harvest and this increased pest problems[4].

Credit sources. Money frequently must be borrowed prior to rice harvest to supplement family income. Bank credit and other credit programs are often only available to richer farmers. Most small farmers borrow money from relatives or friends. At harvest, they repay with rice from their harvest to equal the borrowed funds. Since rice is cheapest at harvest (Rp 1750/10 kg) and price rices after a few months (Rp 2100) and more so directly before the next harvest (Rp 2650 or more) the 'interest' using this method can be considerable.

Root, vegetable and tree crops. The most widely planted root crop was taro, presumably because of its water tolerance. Women farmers, who are the primary vegetable planters, say that only a few vegetables grow on mounds created on these lowlying swampy soils. These included

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[3]The modern variety is planted in the beginning of the rainy season and harvested Jan - Feb, at which point the local variety is transplanted to the field.

[4]Dr. Brown also noted that IR42 is not submergence tolerant, is relatively shorter than local types, does not grow well in peat, and has a 135 day maturity - too long.

stringbean, while squash (waluh putih), bitter cucumber, eggplant and cucumber. Vegetables are used for home consumption. Vegetables are generally planted in May or June. This year few were planted due to high water levels and less harvested due to rat problems.

Tree crops are grown on roadsides or exceptionally high mounds. These include rambutan, jackfruit, sawo and banana. Higher ground is limited and tree crop production is low. One exception is the sago palm, which grew in clumps throughout the area. Women farmers mentioned that they primarily use the raw pith as duck feed.

Other activities. Households generally diversify their on and off-farm activities. In general each household has ducks or chickens in small quantity (≈3-5). During the dry season men travel to outlying galam swamp forest to collect firewood and building materials. Tree species include belanggiran, galam, merapat, wawangun and nipah palm. These are marketted. Women may weave mats, but primarily for home use. Fishing is carried out for home consumption. In the wet season, poles and lines are used. In the dry season basket traps are employed. Men also travel outside of the village to work in nearby Banjarmasin in construction or as becak or bajaj drivers, among other jobs.

Discussion. Rice production is low, and few other crops are grown in Pemajatan. Although women are knowledgeable about the complexities of agricultural techniques and rice varieties, they (as well as male farmers) have little ability or opportunity to increase farm production. While wage labor is widely available at present, increasing population combined with inequitable land ownership may make future income opportunities scarcer.

Increased production and household income could come from improve agricultural technology. One method is rice double cropping. Another is greater emphasis on secondary, vegetable or spice crops for consumption or sale. Both of these require better water control than at present and/or crops well adapted to these conditions. Pests, especially rats, need to be better controlled.

APPENDIX III

QUARTERLY ACTIVITY REPORTS FOR THE AARP/RMI SPECIALIST TEAM AT THE MAROS RESEARCH INSTITUTE FOR FOOD CROPS

QUARTERLY REPORT OF ACTIVITIES
FOR OCTOBER, NOVEMBER AND DECEMBER, 1984

IGMIDIO T. CORPUZ
SOIL SCIENTIST/AGRONOMIST

I. Activities related to research.

1. Discussed with Ir. Reginald le Cerff, MSc student at IPB on the research problem he has to work on his MSc. Research. Before he left for his graduate work, Ir. le Cerff has as his research project in the Soil and Soil Fertility Department the use of organic materials. He raised the question on the importance and relevance of using organic materials in lowland soils. Apparently in his academic exposure at the graduate school he came across many available literatures stating that there is more natural accumulation of organic matter in lowland soils than in upland soils because of slower organic material decomposition. "Why worry adding organic materials in lowland soils?", he asked with seriousness. He was made to understand, however that there is, still the importance and relevance of working on the use of organic materials not in lowland soils but in upland soils. This is especially significant with the present mandate of Balittan Maros to develop and to evolve agricultural technologies to increase the productivity of the soils in dryland-dry climate areas. The use of organic materials in upland dry land is indeed an important and relevant strategy in improving the productivity of the soil in these areas. Organic materials conserve soil and water, improve the soil physical properties and directly supply all the nutrients elements essential for plant

and development. The very low productivity of oxisols and ultisols in many parts of Indonesia can be dramatically increased with the use and application of organic materials. Ir. le Cerff indicated he will give a serious thought on a possible research on the application of organic materials in improving the productivity of soils in dryland- dry climate areas.

Ir. le Cerff has another possible research problem that he may worked on. This is on liming. He is aware on the issue being discussed concerning liming not only in Sulawesi but also in other parts of the country. He is bothered more on the harmful effects of liming rather than on the beneficial effects. His question was related to the role of liming in lower soil fertility. Indeed whether lime is properly and improperly applied ultimated the soil will become less fertile. If this is the case he asked how the soil fertility can be maintained or possibly further improved. This calls for somebody to work on it. He again indicated to give some thought on this issue. He indicated however that he prefers to work on the organic material problem.

2. Discussed with Ir. Singgih Adyantoro and Ir. Oman Suherman the need to modify the approach in conducting the Hybrid Rice Nitrogen Trial. The results of the first trial was not good because of the serious damage due to birds. The hybrid rice flowers almost one month earlier than the parent

restorers, including the other varieties planted in the experimental farm. All the birds flocked to the rice hybrids and caused damage starting from milk stage to maturity stage. Bird boy was hired but it did not help. The approach for the second trial is to stagger sowing and planting so that all the test hybrids and varieties will be flowering thus maturing at the same time. The differences in flowering between the hybrids and the parent restorers were overlooked in the first trial.

3. Discussed with Ir. Lukman Gunarto and Ir. Singgih Andyantoro the need to modify the trial on the use of prilled urea and urea super granule fertilizer applicators. In the first trial the machines did not work satisfactorily as described by IRRI designer. The possible explanation is the amounts of fertilizer that were used. This is especially true for the applicator. The urea applicator will be tried in larger fields so that the hopper will be filled with fertilizer. The weight of the fertilizer has a role in the delivery of the fertilizer. The urea super granule applicators does not work. A serious defect of the machine was detected by a research staff of the Department of Agricultural Machinery, Balittan Maros. This defect had already been reported to Dr. C.P. Mamaril, Coordinator, INSFFER Program who indicated he will refer it to the designer.

4. Discussed with Ir. M. Saleh Pandang, Head, Agronomy/Physiology Department, the need to improve the design of

his research proposal entitled "Percobaan Pengapuran Pemupukan Fosfat dan Legin pada Kacang Tanah". Initially he indicated there is nothing wrong with the design. After he was given some hints he finally discovered the short-coming of his proposal. In the original proposal no treatments were included to test the influence of legin with or without lime and phosphorus, In the methodology it was originally planned to apply urea as blanket including the legin treatment.

5. Improved the experimental designs of some of the research proposals of the Head, Sub-balai Makariki. Despite the availability of computers it is better to have a simple design than a complex design. Computers cannot be employed in the actual conduct of the experiments. The generation of good data should not be sacrificed which is often the case with a complex design.

6. Improved the experimental design of the research project that are being handled by Ir. M. Yahya in cooperation with P.T. Gresik.

   Initially Ir. Yahya had a split plot design for an experiment to test three methods of applying TSP at three rates with nitrogen applied in the form of urea and ammonium sulfate. Using factorial in a RCBD the number of treatments was reduced from 18 to 13.

7. Participated in setting up the following field experiments at Lanrang Substation.

   a. Efficiency of Nitrogen Fertilizers in Rainfed Wetland.

b. Long Term Soil Fertility Trial (INSFFER).

c. Long Term Use of Phosphorus and Zinc in Lowland Rice.

d. Effect of Continuous Use of Organic and Inorganic Fertilizers on Lowland Rice.

e. Machine vs Hand Applied Urea.

8. Participated in gathering data on the following experiments:

a. Response of Hybrid Rice to Nitrogen Application.

b. Long Term Soil Fertility Trial at Maros (INSFFER).

9. Edited the English Translation of the paper of Ir. Lukman Gunarto, Ir. H. Supadmo, Ir. M. Yahya and Ir. A. Buntan entitled "Response of Corn to NPK and S Application in Ultisol at Sinjai, South Sulawesi".

10. Edited the English abstract of the paper of Ir. H. Yasin entitled "Rainfall Parameters as Guide in Cropping System in South Sulawesi".

11. Edited the paper of Ir. M.S. Pandang to be presented during the Monitoring Tour on Farming Systems to be held from Dec. 10 to 19 at the Philippines, Thailand and Indonesia.

II. Other activities:

1. Responded to the Memo of Dr. Roy Saunders on the subject "Agri. business/light Manufacturing Opportunities"

Brief statements were prepared on the following:

a. Rice Straw Utilization (Appendix A)

b. Urea Granulation Enterprise (Appendix B)

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c. Leucaena Integrated Enterprise (Appendix C)

d. Rice Hull Utilization (Appendix D)

2. Guided the Head, Entomology Department, Balittan Maros in locating areas where there are Azolla. This is in preparation for the visit of an IRRI entomologist who is interested in surveying the insects affecting Azolla.

3. Briefed Dr. C.P. Mamaril, Coordinator, INSFFER Program IRRI on the status of INSFFER Trials at Balittan Maros.

4. Attended and participated in all seminars regular and special, held at the Institute.

5. Conducted a special English Lesson for Ir. Surtikanti research staff Department of Entomology, Balittan Maros, to prepare her for the 5-month training course in Insect Pest Management at the Asean Vegetable Research and Development Center (AVRDC) in Taiwan.

Dr. Diodado Castro, Training Officer, and Head, Training and Development office, AVRDC, issued a conditional acceptance to Ir. Surtikanti. There was the need to further improve her English. I accepted the task to help improve the English proficiency of Ir. Surtikanti.

This is how the special English lesson was conducted. Every session an English article was given to her to be read orally. By reading orally it was possible to correct her pronounciation and dictions. Words mispronounced were repeated until they were pronounced properly. Questions asked were based on the article read. This is to test her reading comprehension. Her verbal answers to the questions

were in complete sentences. Words were picked out from the article for translation. She was asked to use each word in a sentence. This was to build up her word power or vocabulary.

A report was made to Dr. Castro of her progress and recommended to him to issue her a final acceptance. In the meantime the session had to be temporarily stopped. I will be on home leave from Dec. 17, 1984 to Jan. 3,1985.

6. Briefed Dr. Diosdado Castro, Training Officer and Head, Training and Development office, AVRDC, Taiwan on the activities of Balittan Maros. I had to assume the task because the Director was on official trip and the Secretary took the Aligu Test.

7. Made available the TOEFL Review Kit consisting of workbooks and cassettes "Two Workbooks and six cassettes were turned over to the library through the director. Several copies of the workbook were distributed to several research staffs especially those who have prospect of pursuing their Ph. D program in the U.S.A.

III. Problems and their Solutions:

There were no problems encountered during the quarter in connection with official duties.

IV. Plans for next quarter (Jan.-March, 1985).

1. Continue participating in implementing field fertilizer experiments.

2. Continue guiding the research staffs in writing up the

results of their experiments both in the presentation in seminars and in publication.

3. Continue providing assistance to other research staff at the Institute.

IV. Activities related to travel.

1. Trip to Bone-Bone, Kabupaten Luwu on October 4 to 6, 1984 with Ir. Abbas Zainal, Head, Mariri Experimental Farm and Ir. Lukman Gunarto, Head, Soil and Soil Fertility Department,Balittan Maros, to observe and gather data from on-going experiments and to locate site for lime study on soybean (Trip Report Appendix 1).

2. Trip to Kendari, South East Sulawesi on October 30 to Nov. 2, 1984 with Ir. Lukman Gunarto, MSc and Ir. M. Yahya to collect bulk soil samples from the different transmigration sites to establish the soil problems in the different sites (Trip Report Appendix 2).

3. Trip to Puriala, Kendari, South East Sulawesi on Nov. 8 and 9, 1984 with Dr. Brian Palmer, IFDC Liaison Officer and Ir. Lukman Gunarto, MSc to locate sites for the AARD-IFDC cooperative project on Fertilizer Use Efficiency on Upland Crops (Trip Report Appendix 3).

4. Trip to Lanrang Sub-Station on Nov, 13, 1984 with Ir. Agustina Buntan to locate site for a New INSFFER Trial (Trip Report Appendix 4).

5. Trip to Bone-Bone, Kabupten Luwu on Nov. 17 and 18, 1984 with Ir. H. Supadmo, MSc and Ir. Djamaluddin Tjongkeng both from the Department of Soil and Soil Fertility to gather experimental data from on-going experiments (Trip Report Appendix 5).

6. Trip to Lanrang Sub-Station on Nov. 23 and 24, 1984 with Ir. Agustina Buntan and Ir. Mufran Rauf both

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from the Soil and Soil Fertility Department to establish field fertilizer experiments (Trip Report Appendix 6).

7. Trip to Bantaeng and Takalar on Nov. 30, 1984 with Dr. Cezar P. Mamaril, Coordinator, INSFFER Program, IRRI, Ir. Lukman Gunarto, MSc and Ir. Agustina Buntan of the Department of Soil and Soil Fertility to collect soil profile samples from sulfur deficient areas (Trip Report Appendix 7).

8. Trip to Lanrang Sub-Station on Dec. 1, 1984 with Dr. Cezar P. Mamaril, Ir. Lukman Gunarto, MSc, Ir. Singgih Andyantoro MSc and Ir. Agustina Buntan to set-up N-Efficiency Trial,to collect soil samples from S-deficient areas and from Long Term Soil Fertility Trial (INSFFER) and to observe on-going experiment (Trip Report Appendix 8).

9. Trip to Lanrang Sub-Station on Dec. 6, 1984 with Ir. Agustina Buntan to apply urea super granules in the N-Efficiency Trial and set-up the Machine applied urea trial (Trip Report Appendix 9).

QUARTERLY REPORT FOR OCTOBER-DECEMBER 1984

Fritz von Fleckenstein
Agricultural Economist, MORIF

During this quarter, the data from the Baju Bodoa study was entered into the computer. Most of this data had not yet been entered by the beginning of the quarter, because the only computer available was my personal computer, which was not located at the office, and because Ir Hadijah Dahlan had many other duties which prevented her giving sufficient attention to Baju Bodoa.

Data entry involved the following steps:

1. Entry from the coding sheets into dBASE II record structures. The number of each record was written on the coding sheet to enable us to quickly check the coding sheet if errors or anomalies were found in the data.

2. Correction of errors or ambiguities found in the data when entering, and noted down in a special book.

3. Filling the information from the face-sheet of a set (which is entered only once for each set) into the other records of the set. This was done using the dBASE II command file FILL.CMD, which I wrote.

4. Filling the code from tanaman into campuran where there is no campuran, and from campuran into tanaman where the whole campuran is concerned. This was done using the dBASE II command file FILL3.CMD, which I wrote.

The data was also systematically validated and corrected during the quarter. This process was a complicated one which involved a number of steps, but whose object was to get the cleanest possible data -- that is, the most accurate data possible. A number of dBASE II command files were written to help in this process.

Data validation and correction involved the following steps:

1. Listing of data after sorting. This was done by two dBASE II command files written by me: LISTWORK.CMD for labour, animal power, machine power and tool inputs; and LISTIO.CMD for material inputs and outputs.

2. Checking the lists made by the programmes above for incorrect parcel/subparcel/season codes. Such incorrect codes can create serious problems in

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later validation and tabulation, so they must be corrected first.

3. Checking the calibration file (CALIBRAT) containing the measured equivalents of the local measures, to make sure that each measure used by farmers for each input is included. This was done by using the dBASE II command file CKLIST.CMD, which I wrote. A number of such local measures were discovered, and Ir Hadijah calibrated them.

4. Converting the data in the fields jumlah, ukuran, harga, and per, which reported amounts in local units and prices per standard or local units, into standard units and values. This was done with the dBASE II command file CONVERT.CMD, which I wrote.

5. Converting some price data case by case. If the price was quoted per local unit instead of per liter or kilogramme, the programme could not convert. A conscious decision had to be made about the unit to which to convert, which in a number of cases was simply units of the product, such as coconuts, hands of bananas, and so forth. The command file LISTIO.CMD, mentioned above, was very useful in helping with this conversion.

6. Checking prices for anomalies. Once each input or output was converted to a single unit, the prices per this unit could be examined for anomalies. This was done in two ways:

   a. by using the listing made by LISTIO.CMD

   b. by using a dBASE II command file called CKPRICE.CMD, which I wrote, and which checks prices reported by farmers against a file of prices collected in local markets.

7. Checking each crop on each plot and each other activity to see that all operations were reported and that labour reported was reasonable. This was done using the listing from LISTIO.CMD

8. Once the data SEEMED to be clean, it was translated from the data entry records into the data processing records, using a dBASE II command file called MAKE700.CMD, written by Ruth von Fleckenstein.

9. The first runs of certain tables, namely the PLOT MODE of the Economics Table, Power Use Table, and Power Type Table, (see below for explanation) were also used to detect errors in the data. These detailed tables revealed such errors as incorrect

codes for inputs or operations (or possibly missing labels from the labels files), missing inputs or operations, missing data for certain months, incorrect parcel/subparcel/season codes, and so forth.

Development of software for the Baju Bodoa study, and thus for the system for monitoring farming system research, continued during this period. In addition to the software developed for validation mentioned above, a number of dBASE II command files were written to produce a variety of tables. These command files generally followed the design of the Farm Analysis Package of FAO, but a number of enhancements were made, and several new tables were designed, as noted below. Design of the programmes was done jointly by Ruth and Fritz von Fleckenstein, and systems analysis and programming was done by Ruth von Fleckenstein.

The following dBASE II command files were written:

ECONTA.CMD	To make economics tables for plot or activity mode.
PWRUSE.CMD	To make power use tables for plot or activity mode.
PWRTYPE.CMD	To make power type tables for plot, activity, or farm mode.
PWRFA.CMD	To make power use table by activities for the whole farm. This is a new table not available in FARMAP.
HSEFA.CMD	To make a household composition table.
ECONFA.CMD	To make a farm summary economics table. This is a new table, not available in FARMAP.
23OTA.CMD	To make a cropping pattern table. This is a new table, not available in FARMAP.

These programmes are interactive. The user can run them easily by answering questions put to him by the computer. They allow the user to choose between English tables and Indonesian tables, between disaggregated and aggregated data, between printed output together with screen output, or screen output alone. In most cases other than farm mode tables, the user can also choose where in the data the tables should start. Thus, he can print the table for only one activity if he likes, or a group of activities beginning at a certain code number.

At the end of this quarter, time was spent preparing for a mini-workshop/seminar to be held at Maros on 5 January, in which the elements of the monitoring system developed in the Baju Bodoa study would be explained to the staff members of the Maros

Research Institute for Food Crops. Separate books were prepared containing the codes, the record structures and the questionnaires, all in Indonesian, together with a set of the preliminary table runs, also in Indonesian. Transparencies were prepared of these and of the coding structures. The seminar/workshop was to last all day, and lunch would be served.

In the middle of October, a team arrived from the Malang Research Institute for Food Crops, consisting of three people from the Agricultural Economics Department: Mr. Charles Van Santen, Mr. Quirin Laumans, both Dutch Technical Assistance experts, and Ir. Sony Leksono. Their primary purpose in coming to Maros was to observe the work we were doing with the Baju Bodoa study, and to become acquainted with our methodology. They also wished to pave the way for future cooperation between Maros and Malang with respect to the collection of Mung Bean varieties and to discuss the transfer of responsibility for the Mariri substation in Luwu. I arranged for them to meet the people involved in these matters.

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APPENDIX IV

QUARTERLY ACTIVITY REPORT FOR THE AARP/RMI SPECIALIST AT THE GONDOL SUBSTATION FOR INLAND FISHERIES

PROGRESS REPORT

1 SEPTEMBER 1983 - 31 DECEMBER 1984

BOGOR/GONDOL

W.E. VANSTONE

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PROGRESS REPORT

1 SEPTEMBER 1983 - 31 DECEMBER 1984

GONDOL

W.E. VANSTONE

GENERAL

INTRODUCTION

My wife and I arrived in Jakarta evening of 31 August 1983 where we were met by Dr. Chhorn Lim who drove us to Bogor. The first day of my 2-year contract with RMI was 1 September and I was head-quartered at Bogor, where we resided in the RMI guest house, through 21 September. From 22 through 29 September I was on travel status enroute to Bali (22 - 24) and in a hotel on Bali (24-29). On 30 September we took up permanent residence on Bali but continued to live in the hotel until 28 November at which time we moved into our almost completed house at Gondol that we had started construction of on 10 October. Since that time construction and landscaping has been completed, some of the errors in construction corrected, furnishing almost completed and a generator shed/meeting room (in good weather when our generator does not have to be operated) errected. It should be noted that about one fifth of the house is used as an office/meeting hall on a regular basis and that the whole house is used as a guest house for visitors to Gondol.

Orientation with RMI and BPPD operations was my main task from 1 to 21 September during which I spent a great deal of time with Dr. Collier, Dr. Lim and Mr. Alie Poernomo in Bogor, with Messers Fritz and Cullen in Jakarta and in visiting several fisheries stations (refer to incountry travel). Since moving to Bali I have been involved : with construction of our house; with construction of the temporv fish holding facilities; as advisor on station

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and research management; as advisor on construction of the permanent facilities; and in getting my portion of the experimental work underway.

During the last week of September 1983 Mr. Tadjuddin Daulay was transfered from Bogor to Gondol where he become acting station head. The BPPD staff which had been based in Singaraja for the previous year or more were moved to Gondol with most of their equipment at the same time. The 2 abandoned houses and a shed at Gondol were converted to very inadequate living quarters, cook house/generator shed for the staff and a start was made on construction of the temporary fish holding facilities.

Some of the staff moved permanently to Gondol in September and took up residence in the old houses or rented room in private houses in the village but most continued to reside in Singaraja and commute occasionelly to Gondol. Most, if not all, of the staff from Singaraja and Mr. djuddin from Bogor finally moved to Gondol in mid May and occupied the two old houses, a house which Perikanan rented in the village and come continued to rent rooms in private houses at their own expense. Part of one of the old houses was also converted to an office at that time.

The new building which will be the physical plant was completed during the third quarter. It does not have a water supply as yet and the electrical lives are only temporary. Part of it is now being used as an office and the rest in being used as accomodation for most of the staff. The old houses on site have been demolished. The old shed being used as a temporary generator building and the fresh water well be demolished shortly to allow for road construction.

Construction of 2 houses on the site was started during the first quarter. From the beginning there was uncertainty whether

or not the duplex was to be a 6 bedroom dormitory (mess) for bachelor staff or two-3 bedroom guest houses. Completion date of this building was originally May then June then August and then November. They are now almost completed. Their water supply is from a line which has branchlines to our house and the temporary fish holding facilities. As yet they have no electricity. Furniture for both units has been ordered and is due to arrive late January.

BUDGET

There have been problems with the budget since we moved to Gondol. From what I could asertain Rp. 50-Rp. 60.000,000 was allocated as operational budget for Gondol for fiscal year 1983/84 but most, if not all, of there monies was used prior to September 1983. From early December 1983 to late February 1984 I loaned the Gondol station Rp. 350,680 for : construction of temporary fish holding facilities; purchase of broodstock fish and fish feeds; and operation and maintenance of the generator and sea water pumps. Gondol has received operational movies since that time but they appear to be running out and may be exhausted before the end of this fiscal year.

STATION MANAGEMENT

The administration of the station at Gondol has been a mess since October 1983. Mr. Achmad Sarnita was station head from 1981 or 1982 while the staff was based in Singaraja. He remained as station head until mid, or late, 1984 when he went on a 4 year study leave to Canada. During my stay on Bali Mr. Achmad visited Gondol for 1 day (5 December 1983) to be present at the laying of the corner stone for the new laboratory complex.

The fisheries section of AARD (Litbang Pertanian) has been undergoing a reorganization since late 1983 and when completed the Gondol station will come under the new Coastal Fisheries section. I have not been informed of the new organization or whether or not it has been finalized .

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Mr. Tadjuddin Daulay was transfered to Gondol in late September 1983 and he was made acting station head. From that time to mid-May he made a few short visits to Gondol. He finally moved to Gondol in mid-May. The organization chart for Gondol was prepared 16 July (Table 1A). Line management as indicated in the chart has not been followed as Mr. Tadjuddin has ordered all staff, both administrative and research, to report directly to him rather than to their immediate supervisor.

The misuse, misplacement and poor supervision of, in some cases, unqualified administrative staff has hampered the research at Gondol (refer to temporary facilities below). The maintenance staff have not done a proper job and this has resulted in misuse and non-maintenance of generators and pumps. We urgently require a fully qualified maintenance supervisor reporting directly to the station head but with total responsibility and the authority to put our physical plant in order and keep it so. We also require a qualified typist who would be responsible to the office manager but assigned to type all research reports. At present most, if not all of the researchers are typing their own reports.

RESEARCH MANAGEMENT

Three research proposals which were to be centred at Gondol were approved for fiscal year 1984/85. These were :

1) Surveying the north coast of Bali for adult milkfish and fry throughout the year by Messers Achmad Sarnata and Agus Prijono. I was to be advisor to this project;
2) a. Breeding prawns and rearing the larvae (b) culturing artemia and (c) culturing phtoplankton and zooplankton as live feed for larval prawns and fish by Messers Tadjuddin, Adiasmara Giri and Tridjoko and Mrs. Tatiek Aslianti;

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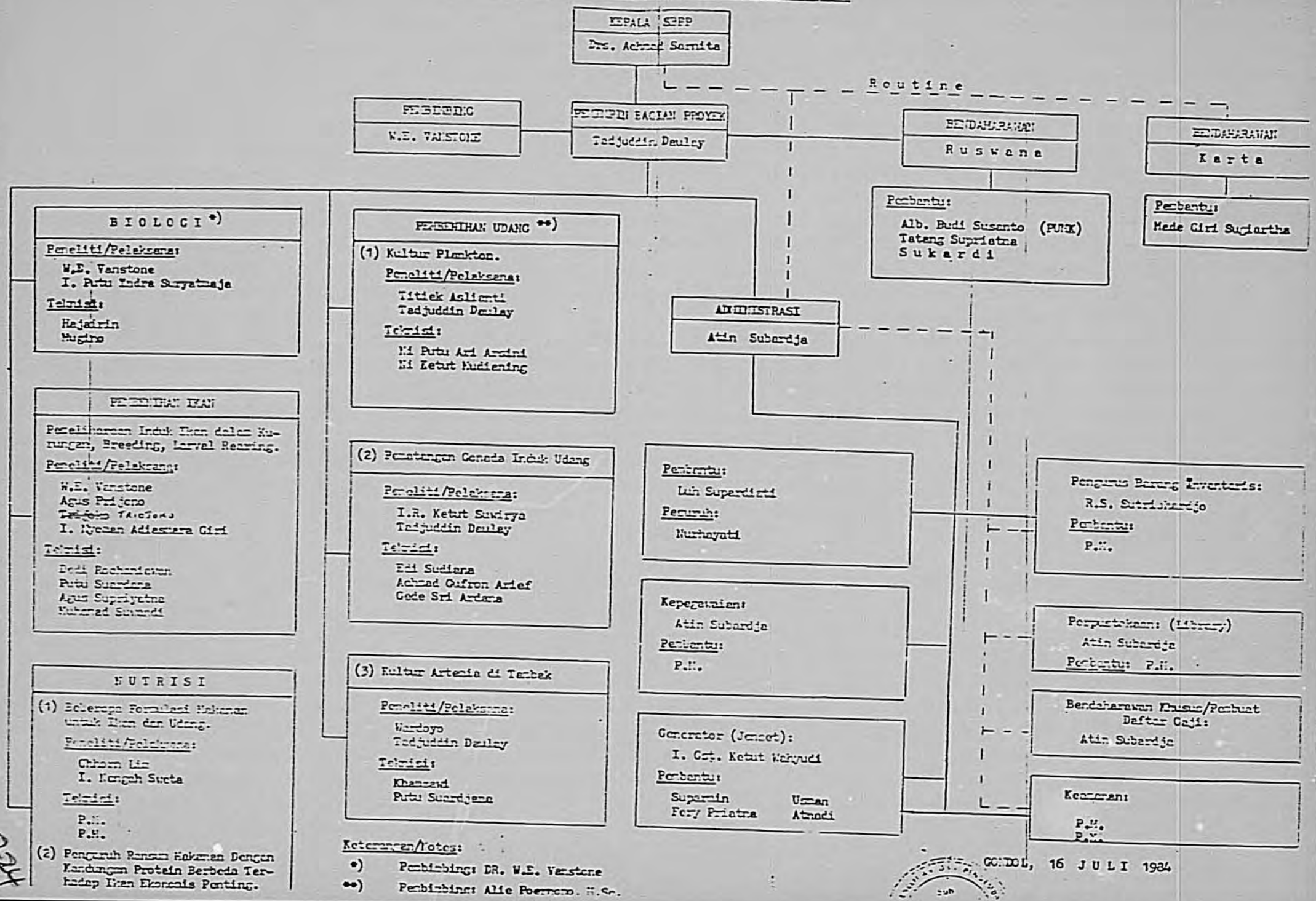
Table 1. [illegible]
[illegible] GONDOL-BALI, 1984/1985



3) Breeding finfishes and rearing the larvae to the fry stage by Mr. Agus Prijono, Mr. Tridjoko and myself.

I believed that each of the 3 projects were full time year round projects and stated that I could not see how Messers Agus and Tridjoko could each work full time on 2 projects. This arrangement was changed verbally in May when Mr. Tadjuddin informed me that Mr. Alie Poernomo had placed we in charge of project (1) replacing Mr. Achmad Sarmita. Mr. Tadjuddin was to remain in charge of project (2) and I was to remain in charge of project (3) At the same time the other Gondol researchers were reasigned so that no researcher was working full time on more than one project. This arrangement was formalized 11 July during a meeting of Messers Alie Poernomo, Tadjuddin and myself and posting of the organization that 19 July (Table 1) in which I was given the additional duty of being advisor to the station head.

As stated above line management as indicated in the chart was not followed. Additionally, Mr. Tadjuddin as well as being station head is shown as reporting to Mrs. Titiek Aslianti and Messers Ketut Suwirya and Wardoyo in the 3 activities of project (2).

During my forthcoming trip to Bogor I hope to have my terms of reference clarified by Mr. Alie Poernomo. I am listed on the Gondol organization chart as advisor to Gondol and also project leader of two projects with a staff of one researcher and two technicians on the milkfish survey project and three researchers and four technicians on the fish breeding project. My researchers and their technicians have been ordered to report directly to Mr. Tadjuddin Daulay and he has been giving them orders without informing me or my researchers. My researchers are confused and it has hampered the two finfish projects. In fact the milkfish survey project was terminated without my knodwledge in late December (see section I.A.a. below).

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TEMPORATY FACILITIES

Construction of temporary facilities for the 3 projects was started in October 1983 and began to become operational in November. Although the intake line was not properly installed and the PVC piping (with very inferior couplings) and solar powered pump are too small we now have a flow through sea water system to these facilities. Construction started 24 May and was completed 7 June. This flow through sea water system has operated reasonably well during the day light hours but failed many times during the night. The major cause of these failures is that the unqualified and poorly supervised maintenance staff do not always service the diesel powered pumps during the night and they run out fuel. Initially we had 2 pumps but one has been out of service for some time and if the present pump breaks down, which it already has on a few occassions, we could lose all our stocks of fish and prawns. Additionally the maintenance staff do not have a stock of replacement parts and even if a belt breaks they have to make a trip to town for a new one. We have already had prawn and fish losses due to lack of flowing sea water on some of the occassions that the pump(s) was not operating.

Initially our electricity was supplied by a small 3 KVA diesel powered generator with a smaller gas powered generator as standby. Two new generators, a 10 KVA and 12 KVA, arrived at Gondol 22 March and were put into service the next day. There has been nothing but problems with them since that time.

No operating or service manuals were supplied with the generators and they were wired inproperly. I informed Mr. Tadjuddin of this in May and the fact was confirmed by the electrial sub-contractor to the site in August or September. In so far as I know the wiring has not been corrected.

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Unfortunately unqualified people were assigned as generator operators and there was no qualified person to supervise them. Several operational errors accured which have resulted in unnecessary expense and disruption of electrical service. No ampmeters were installed and consequently the load on the generators could not be determined. The voltmeters burnt not in June and the speed of the units (hence voltage) was adjusted by listening to the pitch of the motors and observing the bringtnes of an over head light. The generator operators were not on duty 24 hours a day to monitor and service the generators as required. No service log has been kept of their operation. The generator operators did not realize, and some still dont understand, that regardless of amperage (current) used the voltage must be maintained at 220-240 volts. In the beginning they claimed that"less power is required at night- therefore they should operate the generators at 150-180 volts " . The overhead fan in our house burnt out at that time. I installed a voltmeter in our house so that I could monitor the voltage and disconnect our water pump and appliances and turn off our fans whenever the voltage became too high or to low. In June the generator was operating at 300 volts or more (our voltmeter only goes to 300 volts) and the air blower to the prawns and plankton bunt out. It was out for very expernsive repairs for several weeks.

Each of the large generator have been out of service at various times since 4 May. At that time the operators forgot to turn the cooling water on for the 10 KVA and it siezed up. On another occassion someone forgot to check the engine oil in one of the generators and the bearings and pisten burned out.

Both occassions required expensive repairs. Finally about 26 October either the motor or the dynamo of the 12 KVA was sent for repairs and the 10 KVA broke down on the 29th. Power was restored later the some day by combining the motor from one with the dynamo of the other. From then through 4 November the old original 3 KVA operated during the day to supply power to the fish holding facilities and the patched up large generator operated at night to supply the whole complex and several houses in the village. During the 5th and 6th of November the local mechanic and our staff got both the 10 and 12 KVA generators operating off and on and both were fully operational from 7 to 9 November. On 10 November one was again out of service and the 3 KVA was used during the day until the 20th. On 21 and 22 November and on 2 December both large machines were operating but with frequent power outages. From 23 November through 1 December one of generators was not working and from 3 to 22 December one of them was sent to Denpasar for repairs. Both generators worked from 23 December through 1 January (this is being written 23 January). There were problems on 2 and 3 January and parts of one of the generators was sent to Denpasar for repairs. The parts are still in Denpasar.

It will be interesting to see how long the 2 new 275 KVA generators will last after they are put into operation.

On 7 June I received authorization to install a small 3 KVA generator for our personal use. It would be our insurance policy for use during periods when the generator operators do not control the voltage or when the new generators break down. We have used this generator for approximately 10 hours a day almost every day since 29 October.

ince October 1983 we have installed several temporary/ semi permanent tanks for fish and prawns. We have also installed

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a raft for supporting net cages in the bay on the east side of the peninsula. The tanks used for fin fishes and the raft are described below under experimental.

PERMANENT FACILITIES

Construction of; our house; guest house/dormitory; nutrition lab; physical plant building; generator bulding; offices; biological, chemical and disease labs is almost complete. A start has been made on road construction and the permanent fish tanks. It is hoped that the electrical, fresh water, sea water and aeration systems will be installed quickly and that our permanent fish tanks become operational in the very near future.

During the fist quarter of 1984 I made several suggestions regarding changes in construction plans which I believe would minimize future problems :

1. Moving the sea water intake from the west side of the peninsula to the east side and thereby shortening the intake lives from about 500 meters across the reef to low tide on the west coast to a few meters to low tide level on the east coast. This would involve changing all drainage outlets from the east to the west coast of the peninsula.

2. Eliminating the relatively small sea water header tank and installing a continuous flow system from the pumps to the tanks. If discontinuous flow is required to any one tank then the valve to that tank can be closed or opened at will.

3. Duplicating the sea water intake, pumping and distribution system so that one system will be operating while the duplicate system is filled with fresh water. If the 2 systems are alternative on a weekly basis marine growth, which will quickly plug a single system, will be almost eliminated.

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During Mr. Alie Poernomo's recent visit (1-3 January) I learned that all waste water from the laboratories was to be discarged through a lime chamber into the ground. If it is changed reg rly lime will neutralize acid wastes but will have little, if any, effect on radioactive and other toxic materials. I believe that once we are operational the lime will seldom, if ever, be renewed and acids as well an all other laboratory wastes will end up in the ground. Once in the ground they could potentially kill the plants and trees on site, end up in the domestic fresh water supply or seep eastward and enter the ocean near where our floating sea water cages and future sea water intakes are located. These materials should be discharged through solid leak proof pipes to deep water on the west coast of the peninsula.

For similar reasons all discharge water, with its potential of transmitting fish and prawn diseases, from the fish holding facilities should be discharged westerly to the ocean through continuous piper or open drains with no possibility of seepage into the soil. These pipes or drains need not go as for as deep water on the west coast.

During the same meeting I learned that the site plans show a 1.5 inch diameter pipe from the fresh water source to supply all the distribution lines throughout the site. I do not believe this is a large enough pipe and have suggested that an engineer examine the plans taking into account the; pump size, pressure and volume; size of trunk line; number and size of branch lines; and the number and size of their outlets.

ENGLISH LANGUAGE TRAINING

Classes in English for Gondol staff were initiated by my wife during the first quarter. Attendence at these weekly classess was quite large initially but it very very quickly narrowed

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down to a dedicated 8 students. These include 7 Perikanan staff and 1 RMI clerk. Text books for these classes were supplied by RMI and we photocopied them for distribution to the 8 students.

IN COUNTRY TRAVEL :

6-8 September 1983	: With Mr. Alie Poernomo to Denpasar and Singaraja to discuss the research project on Bali and to meet the 13 staff who had been stationed in Singaraja for the past year waiting for the project to start. We met Mr. Sadikin and his party of about 10 people at Pancasari on 7 September and travelled with them to Singaraja, Gondol, Denpasar and Jakarta on 8 September;
9 September	: To Cibalagung with Dr. Chhorn Lim and Mr. Hambali Suprijadi to discuss their research projects;
10 September	: To Depok with Mr. Djoko Susano to discuss their research projects;
12 September	: To Kamal and Anchol with Mr. Djoko Susano to discuss their research projects;
19 September	: To Serang, Karangantu and Bojonegoro with Dr. Chhorn Lim to discuss their research projects;
22 - 24 September	: Moving from Bogor to Bali with my wife;
27 September	: To Denpasar with Mr. Tadjuddin Daulay for my drivers licence and discussion with staff of the Department of Agriculture;
15-27 October	: To Bogor, Jakarta and Jepara : for discussions with Mr. Alie Poernomo and RMI staff at Bogor and Jakarta; and accompanied by Dr. Chhorn Lim

	and Mr. Tadjuddin to Jepara where we discussed the setting up of an experiment on the sexual maturation of the adult milkfish which Mr. Alie Poernomo had reared there since the early 1970's;
12-19 November	: To Jepara to start the experiment on adult milkfish;
14-21 January 1984	: To Jepara to sample the experimental fish;
12-16 March	: To Jepara to sample the experimental fish;
27-31 March	: To Denpasar for meetings with Mr. Paul Stinson of IDRC, Singapore;
15-30 April	: To Jepara, Solo, Bogor and Jakarta to: observe the experimental fish and have discussion with BBAP staff (18th); discussion with Mr. D. Wilson of MONENCO re the lower Solo River Project (19th); discussion with Mr. Alie Poernomo and senior RMI staff at Bogor and Jakarta (21-27th);
9-12 May	: To Solo and Jepara with Dr. R. Bulmar for: discussion with Mr. D. McQueen of MONENCO (10 May) and sampling the experimental fish (11 May);
15-16 May	: To Denpasar to take Dr. Bulmar to the airport;
1 June	: To Denpasar to pick up Dr. W.H.L. Allsopp;
4-5 June	: To Denpasar to take Dr. Allsopp to the airport;
19-21 June	: To Denpasar to: to type work contract and to inform the Department of Manpower of this contract for an RMI driver; make truck repairs and pick up supplies;

July

6-14 : To Bogor with my wife to: attend AAPD meeting (9-10) meet with Messers Alie Poernomo and Tadjuddin Daulay and Dr. Collier re personality and management problems at Gondol (11th); meet with Dr. Collier and Mr. Harwood re equipment for Gondol and other matters (11-12); discuss present and future RMI projects with senior RMI staff in Jakarta (12 July);

9-13 : Mr. Tridjoko to Jepara to sample the experiment fish;

20-21 : To Denpasar to pick up a 3 KVA generator for our personal usey

24-25 : To Denpasar to continue discussion with Dr. Osborn on 24 July, re involvement of the Oceanic Institute of Hawaii in milkfish research, prior to his early flight the following morning;

September

3-5 : To Denpasar for truck repairs and supplies;

8-14 : To Jepara and Surabaya to : sample the experimental fish; have discussions with Dr. Chhorn Lim and senior staff of Comfeed and visit their prawn farms;

September/
OCtober

29-13 : To Jepara (1 Oct.), Bogor (2-9 Oct.), Jepara (11 Oct.) to; check on experimental fish; have discussions with RMI and Fisheries personal; and register the RMI truck;

October

25-28 : To Jepara with Messers I Nyoman Adiasmara Giri, Putu Suardana and Agus Supriyatna to transport 10 adult milkfish to Gondol;

October/
November

30 - 3 : To Denpasar for supplies;

November

10-18	: To Jepara to sample adult milkfish and get a load of 10 of them on their way to Gondol (13 Nov.) and to give a seminar to Jepara staff;
11-14	: Messers Tridjoko, Dedi Rochaniawan and Muhamad Suwandi to Jepara to transport the above 10 adult milkfish to Gondol;
15-18	: Messers I Nyoman Adiasmara Giri, Putu Suardana and Agus Supriyatna to Jepara to transport 12 adult milkfish to Gondol;
25-28	: To Denpasar to try to obtain truck parts;
26-29	: Messers Agus Prijono, Dedi Rochaniawan and Muhamad Suwandi to Jepara to transport 12 adult milkfish to Gondol;

November/ December

30-2	: Messers Tridjoko, Putu Suardana and Agus Supriyatna to Jepara to transport 12 adult milkfish to Gondol;

December

3-5	: Messers Agus Prijono, Dedi Roachaniawan and Muhamad Suwandi to Jepara to transport 11 adult milkfish to Gondol;
6-11	: To Denpasar to service truck;
24-25	: To Denpasar to bring Dr. Camacho and family to Gondol;
29-30	: Mr. G.P. Sudiarta to drive Dr. Camacho and family to Denpasar

Some of the visiters to Gondol during 1984 :

January

?	: Most, if not all, of the Japanese researchers from the Mariculture Research and Development Project at Karangantu, Serang, some of their wives and children and Ryo Okamoto who was evaluating

	the JICA project spent the day with us discussing mutual research goals, acheivements and problems;
March	
2	: Mr. and Mrs. Sadikin and party;
28	: Dr. Collier, unfotunately I was in Denpasar for meetings with Mr. Paul Stinson of IDRC, Singapore;
April	
17	: Mr. Jim Myers and party, unfortunately I was in Jepara observing the experimental fish and enroute to Solo and Bogor;
5-15	: Dr. Ross Bulmar on a business holiday;
6-7	: Mr. Alie Poernomo and Dr. Chhorn Lim
Late May or early June	
?	: Messers Terry Agasit and Budhoyo Sukotjo spent part of a day at Gondol. We prepared lunch for them but they were informed that were not on site and left without meeting us;
June	
1-3	: Dr. W.H.L. Allsopp on weekend leave from the MONENCO (CIDA funded) lower Solo River Project;
July	
18	: Dr. Paul O. Maugle, artemia expert;
23-24	: Dr. K.W. Osborn of USAID;
August	
10	: Dry I Gusti Ketut Oka Ranuh, director of the Department of Agriculture on Bali and his wife.

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September

4 : Messers Terry Agasit and Ricardo Hechanova. I was in Denpasar at the time but we had a very productive meeting on facility construction at Gondol from 0630 to 1130 hours in Kuta on 5 September;

17-18 : Mr. Alie Poernomo and 2 associates from Denpasar;

November

14 : Messers Terry Agasit and Budhoyo to discuss site development. Unfortunately I was in Jepara at the time;

19 : USAID Mission of Dr. M.R. Willard and Messers C.L. Angell, A. Dwipongg and Saud;

21 : World Bank mission of Dr. Keechai Chong, Rudy Semittou and Roberts and Messers Dwipongg and Fuad Cholik;

December

25-29 : Dr. Camancho and family

EXPERIMENTAL

I. MILKFISH

I.A.GONDOL

I.A.a. Milkfish Survey

Mr. Putu Indra Suryatmaja arrived in Gondol in mid-May and was immediately assigned to this project. At the same time I was informed by Mr. Tadjuddin that Mr. Alie Poernomo had made me leader of this project in place of Mr. Achmad Sarmita. Mr. Tadjuddin insisted on directing this project and since I had not been officially notified of my position I allowed him to direct it with me in my original position as advisor. I thought that the matter was settled 11 July when Mr. Alie Poernomo had a meeting with Mr. Tadjuddin and myself and on the organization

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chart of 16 July I was showen as project leader. Mr. Suryatmaja started to collect his data mid-June.

Mrs. Titiek Aslianti who was head of the phytoplankton and zooplankton project (production of live feeds, excluding artemia, for larval fish and prawns) went on maternity leave in October. Mr. Putu Indra Suryatmaja was assigned as head of her project on 17 October. Since that time I believed that Mr. Suryaatmaja would continue to be responsible for his milkfish survey project as well as being responsible for the plankton project.

I did not know, until I was informed by Mr. Suryatmaja to day 19 January until preparing this section, that on 21 December Mr. Tadjuddin Daulay suggested to Mr. Suryatmaja's technician that he terminate the fry collection portion of this milkfish survey project. Mr. Suryatmaja was later told by Mr. Tadjuddin that he may continue to collect oceanographic and atmospheric data on an occasional basis but that he must devote his full efforts to the plankton project.

Mr. Suryatmaja's three quarterly reports for 1984 are attached as appendicies A, B and C and his original data from 19 June to 21 December for Gondol and from 15 July to 23 December for Perjarakan are attached as appendicies D and E. His final report for this project from mid-May is as follows :

SURVAY NENER DAN BANDENG DEWASA
DI PANTAI UTARA BALI

FINAL REPORT

Peneliti : W.E. Vanstone
P. Indra Suryatmaja
Tehnisi : Fery Priatna
Mugino

SUB BALAI PENELITIAN PERIKANAN BUDIDAYA PANTAI
GONDOL - BALI

Pertengahan Mei - Desember 1984

I. Pendahuluan

Informasi mengenai potensi sumberdaya perikanan dalam hal ini nener (benih bandeng) sangat diperlukan sebagai dasar pertimbangan tingkat pengusahaannya.

Menurut keterangan beberapa penyetok dan pedagang pengumpul nener di pantai Utara Bali, hasil penangkapan nener selama beberapa tahun terakhir ini menurun. Untuk mengetahui sebabnya maka dilakukan suatu survey mengenai potensi nener di pantai Utara Bali.

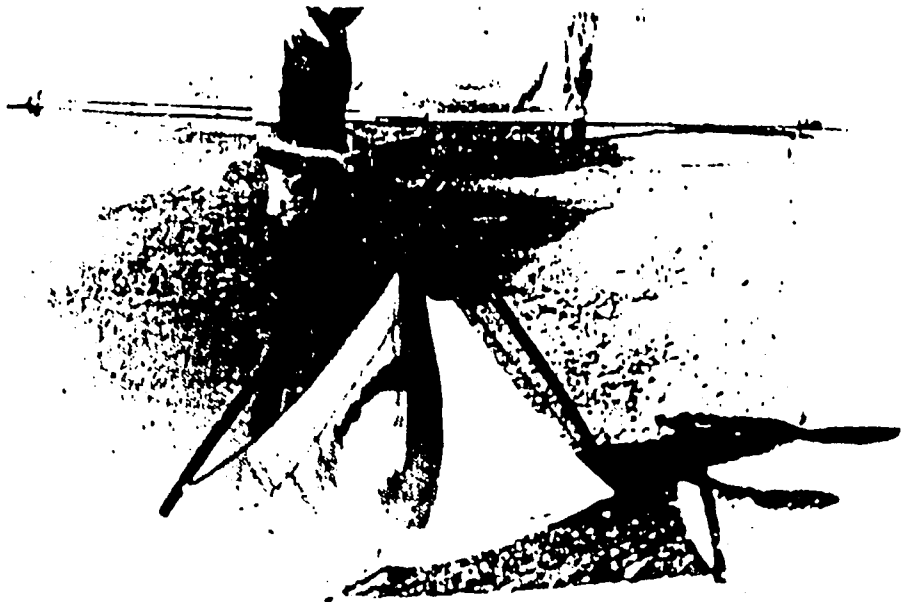
Beberapa informasi tentang penangkapan induk-induk bandeng yang matang genad oleh nelayan-nelayan di pantai Utara Bali juga dituangkan dalam tulisan ini.

Tujuan survey ini adalah :

1. Untuk mengetahui potensi nener di pantai Utara Bali.
2. Untuk mengetahui daerah pemijahan induk bandeng di pantai Utara Bali serta musim pemijahannya.

II. Metoda

II.1. Survey potisi nener dilakukan dengan cara mewawancarai penyetok dan pedagang pengumpul nener serta Dinas Perikanan D.T. II Buleleng. Dan untuk melengkapinya juga dilakukan percobaan penangkapan nener pada dua buah stasiun, Gondol dan Pejarakan. Nener dikumpulkan dengan setok kecil yang lebar bagian depannya satu meter (Gambar 1). Penangkapan dilakukan setiap hari pada pk. 8^{00} - 9^{00} dan 15^{00} - 16^{00} atau 10 kali setokan.



Gambar 1. Alat setek yang digunakan dalam percobaan penangkapan nener.

Disamping itu dilakukan pengukuran temperatur air dan udara, pH, arus dan gelombang, keawanan (claudneés) dan juga akan dihubungkan dengan phase bulan.

II.2. Survey tentang penangkapan bandeng dewasa, daerah penangkapan dan musim penangkapan dilakukan dengan cara mewawancarai nelayan penangkap bandeng di pantai Utara Bali.

III. Hasil dan pembahasan

III.1. Penangkapan nener di pantai Utara Bali

Di daerah ini terdapat dua musim penangkapan nener,

pada "sasih kesanga" yaitu bulan April, Mei dan Juni, "sasih kapat yaitu bulan September, Oktober, November, Desember dan kadang-kadang sampai bulan Januari. Akan tetapi pada tahun ini (1984) musim nener hanya pada bulan Mei dan Juni serta mulai pertengahan September hingga pertengahan bulan Desember.

Menurut Dinas Perikanan D.T. II Buleleng, penangkapan nener dilakukan di pantai Utara Bali sepanjang kira-kira 144 km. Alat tangkap yang digunakan adalah seser atau sotok. Di daerah ini dikenal dua macam sotok yaitu sotok

Gambar 2. Penangkapan nener dengan sotok kecil

(Gambar 2),

kecil V. lebar bagian depannya lebih kurang satu meter, dan sotok besar, lebar bagian depannya antara dua sampai empat

meter yang dilengkapi dengan kantong pada bagian belakangnya. (Gambar 3).

Gambar 3. Penangkapan nener dengan sotok besar

Nener yang tertangkap di patai Utara Bali sejak tahun 1979 hingga 1983 dapat dilihat pada Tabel 1.

Tabel 1. Jumlah nener yang tertangkap di Buleleng (pantai Utara Bali)#

tahun	Jumlah nener yang tertangkap
1979	8.300.000
1980	8.500.000
1981	10.500.000
1982	8.500.000
1983	6.800.000

Sumber, Dinas Perikanan D.T. II Buleleng

Dapat dilihat bahwa jumlah nener yang tertangkap, paling tinggi pada tahun 1981, kemudian makin tahun jumlahnya menurun.

Pada tahun ini (1984) jumlah nener yang tertangkap berdasarkan wawancara dengan para penyotok (Gambar 4) adalah sebanyak 5.831.400 ekor sedangkan berdasarkan hasil wawancara dengan para pedagang pengumpul nener sebanyak 5.014.875 ekor.

Data selengkapnya dapat dilihat pada Tabel 2 dan Tabel 4.

Tabel 2. Rata-rata nener tertangkap perhari oleh 1 orang penyotok pada musim nener th.1984 di Pantai Utara Bali

Lokasi	Jumlah penyotok#	Musim kesanga (Mei dan Juni)	Musim kapat (Sept,Okt,Nop,Des)
Gerokgak	800	53	55
Seririt dan Banjar	1.150	41	48
Buleleng	350	33	39
Kubutambahan dan Tejakula	900	33	34

Keterangan :

#. Sumber Dinas Perikanan Dati II Buleleng

Catatan :

-. Jumlah hari penangkapan nener selama musim kesanga 1984 adalah 18 hari

-. Jumlah hari penangkapan nener selama musim kapat 1984 adalah 27 hari

Dengan demikian dapat dihitung bahwa jumlah nener yang tertangkap pada tahun 1984 berdasarkan penyotok adalah 5.831.400 ekor (perhitungan pada Tabel 3

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Tabel 3.

Perhitungan jumlah nener yang tertangkap oleh penyotok pada masing-masing Kecamatan.

<u>Sasih kesanga</u> :

Kecamatan Gerokgak	800 x 53 x 18	=	763.200
Kecamatan Seririt dan Banjar	1.150 x 41 x 18	=	848.700
Kecamatan Buleleng	350 x 33 x 18	=	148.500
Kecamatan Tejakula dan Kubutambahan	900 x 33 x 18	=	207.900

<u>Sasih kapat</u> :

Kecamatan Gerokgak	800 x 55 x 27	=	1.188.000
Kecamatan Seririt dan Banjar	1.150 x 48 x 27	=	1.480.400
Kecamatan Buleleng	350 x 39 x 27	=	368.500
Kecamatan Tejakula dan Kubutambahan	900 x 34 x 27	=	826.200
	J u m l a h		5.831.400

Gambar 4. Wawancara dengan salah seorang penyetok.

Tabel 4. Hasil pengumpulan nener oleh pedagang pengumpul di pantai Utara Bali tahun 1984

Lokasi	Musim kesanga (Mei dan Juni)	Musim kapat (Sep,Okt,Nop,Des)	
Kampung Bugis	442.500	525.000	
Pangastulan	300.000	600.000	
Brongbong	411.000	260.000	
Celukan Bawang	35.875	58.500	
Sumber kima	500.500	987.500	
Tejakula	275.000	470.000	
Kubutambahan	60.000	100.000	
Jumlah	2.029.875	3.001.000	5.014.875

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Adanya perbedaan jumlah nener yang tertangkap oleh penyetek dengan jumlah yang dikumpulkan oleh pedagang pengumpul mungkin disebabkan karena adanya pedagang pengumpul yang lain yang tidak dapat di wawancarai dalam survey ini.

III. 2. Penangkapan bandeng dewasa di pantai Utara Bali

Dari hasil wawancara dengan nelayan penangkap bandeng dan atau nelayan di pantai Utara Bali dapat diketahui bahwa penangkapan induk-induk bandeng paling banyak dilakukan di pantai Seririt, Alat tangkap yang digunakan adalah pancing dan jaring tengkel (gill net), pada jarak lebih kurang 150 m dari pantai. Bandeng yang tertangkap kebanyakan dijumpai dalam keadaan matang gonad. Bandeng-bandeng tersebut tertangkap pada malam hari, berselang antara lima hari sesudah dan sebelum bulan purnama dan bulan mati, mulai bulan September sampai dengan bulan Desember. Sebelum tahun 1982 bandeng yang tertangkap di pantai Seririt rata-rata mencapai 50 ekor/malam pada musimnya. Akan tetapi setelah tahun 1982 jarang sekali bandeng-bandeng dewasa yang tertangkap. Di daerah-daerah lainnya hanya kebetulan saja bandeng dewasa yang tertangkap. Bandeng yang tertangkap tersebut mempunyai ukuran antara 50 - 100 Cm.

Dengan demikian dapat diperkirakan bahwa sekitar bulan September hingga bulan Desember merupakan musim pemijahan induk-induk bandeng di daerah ini. Kalau dilihat dari segi adanya nener di pantai maka dapat diperkirakan bahwa musim pemijahan bandeng di pantai Utara Bali adalah mulai bulan

Maret sampai dengan Mei dan mulai bulan Agustus sampai dengan bulan Desember (nener yang dijumpai atau ditangkap di pantai diperkirakan berumur 3 minggu). Penelitian yang lebih mendalam masih sangat diperlukan.

Karena kurangnya fasilitas maka survey daerah pemijahan dan ekologi daerah pemijahan tidak dapatt dilakukan pada tahun anggaran ini.

III.3. Percobaan penangkapan nener di pantai Gondol dan pantai Pejarakan.

Data percobaan penangkapan nener di pantai Gondol mulai tanggal 19 Juni hingga 21 Desember dapat dilihat pada Tabel 5 dan di pantai Pejarakan pada Tabel 6 (data selengkapnya disajikan pada Lampiran)

Tabel 5. Jumlah Nener, Suhu udara, Suhu air, Salinitas, PH, Arus, Gelombang dan Keawanan Pada Percobaan Penangkapan Nener di Pantai Gondol 19 Juni- 21 Des 1984.

Jumlah hari Sampling	5	23	31	27	25	24	21
Jumlah Nener	0	0	14	4	11	65	19
Suhu Udara							
Kisaran	27-30	24-29,5	26,5-33	26-31	26-32	26-33	26-32
Rata-rata (0.C)	(29)	(29)	(29)	(29)	(28,5)	(29)	(29,5)
Salinitas							
Kisaran Rata-rata	-	-	-	33-38	34-38	34-36	34-35
PPT	-	-	-	36	35	35	34,5
Phase Bulan Purnama	13	12	11	10	9	8	8
Last Quartes	21	20	19	18	17	15	15
Bulan Mati	28	28	26	24	24	22	11
First Quartes	6	5	3	2	1/31	30	29
PH							
Kisaran	-	-	-	8,0-8,7	8,2-8,5	8,0-8,5	8,0-8
Rata-rata	.			(8,3)	(8,3)	(8,3)	(8,3)
Arus (% Hari)							
0	-	-	-	-	-	-	-
Lemah	95	63	40	33	51	60	44
Kuat	5	37	60	67	49	40	66
Gelombang (% Hari)							
0	50	50	52	60	68	65	47
Lemah	50	50	48	35	32	35	63
Besar	-	-	-	5	-	-	-
Keawanan (% Hari)							
0	90	23	12	7	17	21	0
1-10 %	-	35	35	29	31	14	6
11-20 %	-	13	4	7	14	9	9
21-30 %	-	6	14	16	18	20	36
7-30 %	-	23	35	49	20	36	49

Tabel 6. Jumlah Nener, Suhu udara, Suhu air dan Gelombang Pada Percobaan penengkapan Nener di Pantai Pejarakan 15 Juli-23 Desember 1984

Jumlah hari sampling	15	28	20	31	30	23
Jumlah Nener	0	0	317	200	94	86
Suhu udara.						
Kisaran	23-33	25-30	26-30	26-29	26-29	25-29
Rata-rata	(27)	(27)	(27)	(26)	(26)	(26)
Suhu air.						
Kisaran	24-31,5	26-31,5	28-39	27-31	27-31	27-30
Rata-rata	(28)	(29)	(29)	(28)	(28)	(28)
Gelombang (% / hari						
0	44	29	12	-	-	-
Kecil	11	38	47	-	-	-
Besar	45	33	41	-	-	-

Karena musim nener pada tahun ini sudah selesai pada pertengahan bulan Desember dan dengan saran bapak Taddjudin Daulay, maka percobaan penangkapan nener dihentikan pada tanggal 22 Desember 1984, kemudian untuk seterusnya diadakan pengukuran parameter kualitas air paling tidak sekali dalam seminggu.

I.A.b. Broodstock, breeding and larval rearing.

During the past year we have used a number of tanks for our milkfish, rabbit fishes and other fin fishes. We have recently standardrized the coding of these tanks. A diagrammatic layout of the tanks, together with their present and previous coding, is presented as Figure 5.

Series A are green fibreglas circular tanks with conical bottoms and a central 1 inch drain. Diameter 150 cm, depth at sides 95 cm, depth at centre 140 cm.

Series B are green canvas circular tanks with flat bottoms and a central 2 inch drain. Diameter 6 m, depth 2 m.

Series C are black canvas circular tanks with flat bottoms and a 2 inch drain in the wall close to the bottom. Diameter 7 m, depth 120 cm.

Series D are grey canvas circular tanks with flat bottoms and a 1.5 inch drain in the bottom close to the wall. Diameter 6 m, depth 110 cm.

Series S are green fibreglas circular tanks with flat bottoms and a 1 inch drain in the wall close to the bottom. Diameter 106 cm, depth 66 cm.

Other tanks which are used for spawning, egg incubation and larval rearing are :

Series E are black fibreglas circular tanks with conical bottoms and a 1 inch central drain. Diameter 105 cm, depth at sides 42 cm, depth at centre 95 cm;

Series F are green fibreglas circular tanks with flat bottoms and a 1 inch drain in the wall close to the bottom. Diameter 90 cm, depth 85 cm,

Series G are green fibreglas circular tanks with conical bottoms and a 1 inch central drain. Diameter 138 cm,depth at sides 60 cm, depth at centre 128 cm;

Series H are white fibreglas rectangular flat bottomed tanks without drains. Width 60 cm, length 100 cm, depth 49 cm.

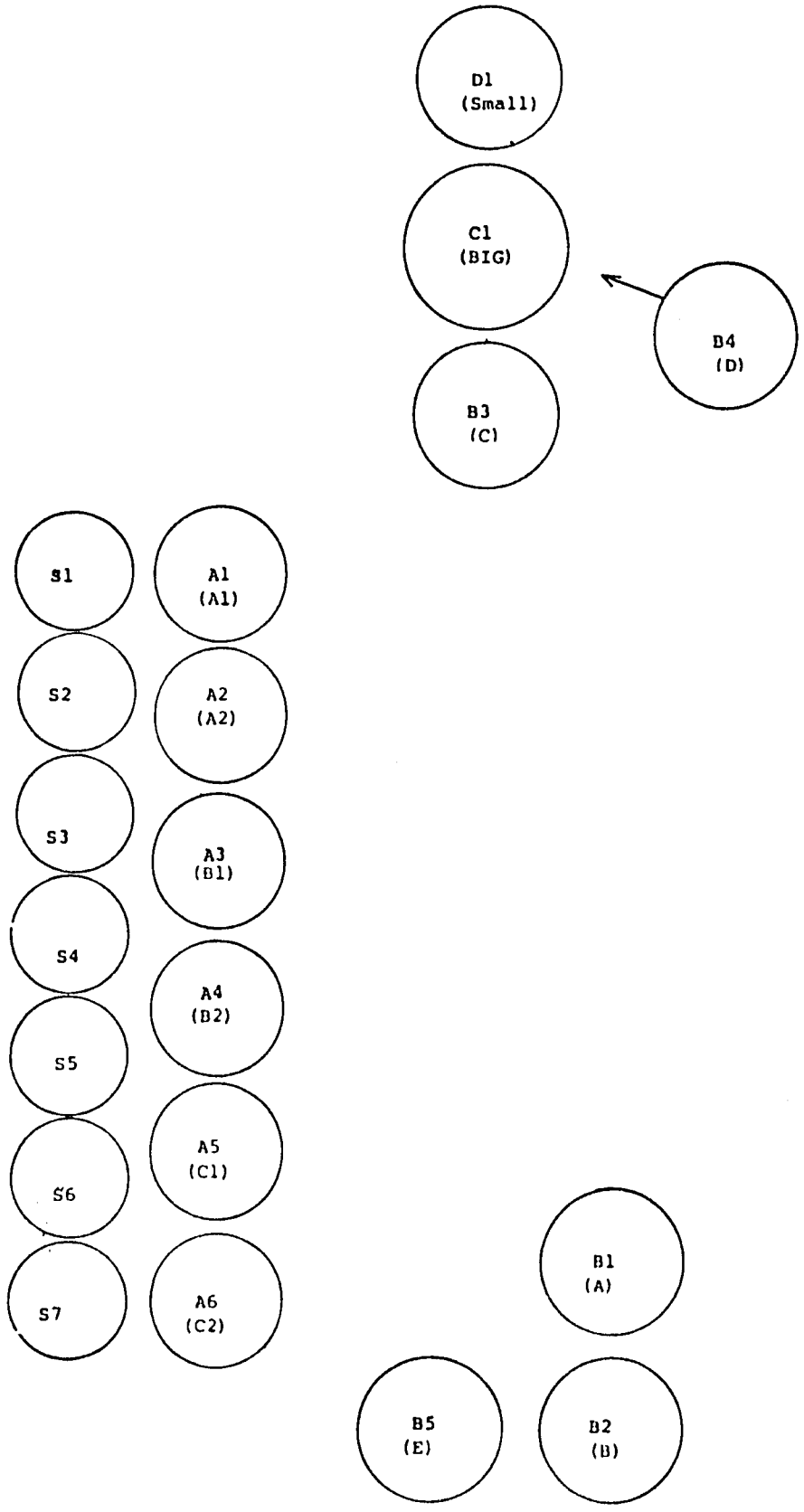

Figure 5 . Diagrammatic layout of the tanks refered to in text. Refer to text for dimensions. Previous coding of these tanks are in parenthesis. Tank C1 broke during the year and was replaced with tank B4.

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In addition to the above tanks we have constructed a bamboo raft capable of supporting four 6 x 6 m square 3 m deep net cages. This raft was positioned in the bay east of the peninsula on 23 August and we began to stock the cages on 10 September.

I was worried that we may not have been able to locate our floating cages at Gondol. The coral reef, which dries at low tide in about 500 m wide on the west side of the peninsula and during the north west mansoom from about November to April the wave action on this coast would be to strong for our cages. At the time of positioning our raft we had not had the usual strong easterly winds associated with the north east monsoon. We had very strong NE winds in September/October but the heavy wave action was north of our raft. The position of the raft looks good but I am still worried that the 1984 NE mansoon may have been abnormal.

We have encountered one problem with the raft. It acts as an artificial reef and the local fishemen are fishing from it. They have been told not to do this but the rulling is not being enforced. They may damage our nets and, if they are like fishermen I have encountered elsewhere, poach our stocks of fish.

I.A.b.1. Future Broodstock

Messers Agus Prijono, I Nyoman Adiasmara Giri and Tridjoko and their four technicians successfully stocked tanks C1 and D1 with 22 kg young milkfish which they obtained from a fish farm in Benoa 13 June and transported to Gondol. Of the 107 fish obtained at Benoa 7 died during transport and 2 died shortly thereafter. Tank D1 broke on 24 June and the 49 fish therein were transfered to tank C1.

On 7 July the sea water pump broke down and was not repaired for several days. Of the 98 fish in tank C 1 ; 2 died on 10 July; 3 on 11 July; and 1 on 15 July. On 28 August 40 fish were transfered to 2 newly errected B-series tanks (B1 and B2) at a final density of 20/tank. This was an extreemly lucky move since tank C1 broke on 30 August and 47 of the 52 fish remaining in it were killed or lost to sea. The surviving 5 fish were placed in tanks B1 (3 fish) and B2(2 fish). Two of the 3 fish placed in tank B1 died shortly thereafter. On 10 September the 21 fish remaining in tank B1 were transfered to floating cage A and there have been no losses since then. Of the 22 fish left in tank B 2 : 1 died on 15 October; 1 on 31 October; 1 on 6 November and 4 died 9 November following anaesthesia with clove oil and determination of their weights and lengths. The remaining 15 fish were transfered from tank B2 to floating cage B on 21 November where 4 died shortly thereafter. There have been no mortalities in cage B since that time. At the end of 1984 there were 21 underyearling milkfish in cage A and 11 in cage B. The 32 fish to appear to be in excellent condition.

From 13 June to 19 October these fish were fed chopped trash fish at a rate of 4% body weight in the morning (0600-0700) and 4% in the afternoon (1500-1600). From 20 October through 19 December, due to the increase in price of trash fish during the period of full moon, the fish were fed to satiation twice a day with trash a day with trash fish during the periods of new moon and to satiation twice daily with pellets prepared at Gondol during the full moon period. The pellets consisted of 5 parts trash fish plus 4 parts Comfeed chick starter (2-4 week). From 20 December to the present they have been fed twice daily to satiation with pellets only.

I have recommended on several occassions that a further 300 young milkfish of the 1984, or if possible earlier, crop of fry

be obtained and reared as future broodstock. This has not been done or yet.

Their 3 quarterly reports for this sub activity for 1984 are attached as Appendicies F, G and H.

I.A.b.2. Adult broodstock-transport and maintenance

From 27 October through 5 December Messers I. Nyoman Adiasmara Giri, Tridjoko and Agus Prijono and their 4 technicians made 6 trips to Jepara to transport all but one of the ramaining adult milkfish from there to Gondol (refer to section on incoutry travel). In so far as I know these approximately 15 hour transports of adult milkfish were the longest ever made and they were very successful. Especially so as the fish were very roughly caught and manhandled during capture at Jepara. Of the 67 fish obtained at Jepara 5 died during transport and 3 died shortly after their arrival at Gondol (Table 7).

Transport was by truck. A canvas tank was installed in the box of the truck and filled to a depth of about 25 cm with sea water at Jepara. The fish were then captured and carried individually in a plastic bag, containing water, from the rearing pond or experimental tank to the truck where they were released into the canvas tank. Fresh water was added to the sea water in the tank to a total depth of about 40 cm as soon as the 10-12 fish were in the tank. Five 30-35 kg blocks of ice were them added and the top of the tank closed. Final weight of water was approximately 2 tonnes at a temperature of about 19° and a salinity of approximately 26‰. The water in the tank was supplied with continuously flowing oxygen through 4 airstones. Approximately 2.5 tanks of oxygen were used each trip.

Upon arrival at Gondol the fish were distributed between 5 Series B tanks containing 80-90 cm continuously flowing sea water and aeration (Table 7). Salinity of the water in each tank

Table 7. Source at Jepara and movement of adult milkfish among the 5-6 m diameter 2 m deep canvas tanks at Gondol from 27 October through 5 December 1984. There was no further change during December.

Dates of capture and transport	Source at Jepara	Numbers of Fish		Number of Fish in various tanks at Gondol					Number died at Gondol
		Captured*	Died during transport	B1	B2	B3	B4	B5	
27-28/10	Pond	3	0						
	Tank D	7	0			10			
13-14/11	Tank D	10	0			10	10		
						10	9		1-17/11
17-18/11	Tank D	12	1	11		10	9		
				10		10	9		1-19/11
28-29/11	Tank A	12	2	10	10	10	9		
				10	9	10	9		1-30/11
**				0	9	15	14		
1-2/12	Tank B	12	2	0	15	15	14	4	
4-5/12	Tank C	7	0						
	Tank D	4	0	0	15	15	14	15	
TOTALS		67	5	59					3
Summary from Jepara	Pond					3			
	Tank A				9				
	B				6			4	
	C							7	
	D					12	14	4	

* One blind fish was left in tank D at Jepara.

** 5 fish moved to tank B3 and 5 to tank B 4 from tank B1 on 1 December.

had been decreased the day previously to between 12 and 20‰. and was maintained at approximately 15‰ for a few days to allow each group of fish to overcome the stress of capture and transport. After the salinity in each tank had been increased to that of full sea water the fish were fed to satiation twice a day with either chopped trash fish or pellets (refer to section I.A.b.1 for composition) until 19 December. From 20 December to the present they have been fed twice daily to satiation with pellets only.

Their report for this sub-activity is included in Appendix H.

I.B. JEPARA

The fisheries station at Jepara was designed and constructed during the early 1970s for research on fry production and pond culture of milkfish and prawns. It was originally under BPPD with Mr. Alie Poernomo as its director.

During 1974 and again during 1975 or 1976 Mr. Alie Poernomo had two- 1 hectare ponds stocked with milkfish fry from the ocean. Each pound measures 50 x 200 meters and there is a short channel connecting the two. Water depth varies between 40 and 60 cm depending on the height of the tide. Salinity in the ponds ranges from 5‰ during the rainy season to 35-40‰ and higher during the dry season. It was estimated that there was 200 fish in the ponds on 7 October 1983.

From the time of stocking the ponds to 7 October 1983 the fish were normally fed an artificial diet daily but due to financial restraints they relied on natural food in the ponds during 1982. During the entire period the ponds were dried every 6 months and fertilized with organic fertilizer at a rate of 1 tonne/ hectare. The ponds were also fertilized monthly with: urea at 50 kg/hectare; and super phosphate at 50 kg/hectare.

On 8 October 38 fish were transfered from the pond system to a 10x20x2 m deep concrete tank (tank D) containing water at a depth of 1.85 m. Salinities in the ponds and the tank at that time were 30‰. No fish died during the transfer but 2 fish died in the tank between 8 and 24 October.

Between 9 and 24 October one third of the water was supposed to be exchanged daily and beginning 9 October the fish were fed an artificial diet (Jepara pellets, containing 36.5% protein and 5-10% moisture) at a daily rate of 5% body weight on the assumption that each fish weighed 3 kg.

On 24 October we anaesthetized and examined 6 fish from tank D and killed 2 females. The results are presented in Table 8.

On 25 October we proposed to Jepara staff, and in particular Mrs. Anindiatudi and Mr. Pujiatna who will be working with us, that we return 14 November and start an experiment designed to determine the effect of diet and tank shape and size on sexual maturation of these relatively old milkfish. In the meantime they would transfer more fish from the pond system to tank D and commence feeding them with an artificial diet formulated by Dr. Chhorn Lim, but prepared in Jepara, at a rate of 3% (air dry weight) of body weight per day.

On 15 November we weighed and measured 11 fish from tank D and killed 3 of them for more detailed examination (Table 8). Twenty fish were then placed in each of 3 tanks : Tanks A and B, rectangular concreate tanks 8 m long x 5 m wide x 1.5 deep; and tank C, circular canvas tank 7.2 m in diameter and 1.2 m deep. Fifty one fish were left in tank D.

Table 8. Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

JEPARA PRE EXPERIMENT

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	TWX100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
24-10-1983	D1	S	-	-	56	-	2500	-	-	-	-	-	
	D2	S	-	-	55	-	2280	-	-	-	-	-	
	D3	K	F	-	58	-	2400	-	-	5,4	0,22	-	Developing
	D4	S	-	-	52,5	-	-	-	-	-	-	-	
	D5	S	-	-	54	-	-	-	-	-	-	-	
	D6	K	F	-	54.5	-	1700	-	-	2,9	0.17	-	
Averages							2220			4,2	0.20	-	
15-11-1983	D7	K	F	50	-	62	1744	1,40	0,73	6,6	0,38	-	Developing
	D8	S	-	52	-	65	2968	2,11	1,08	-	-	-	
	D9	K	F	51	-	59	1540	1,16	0,74	15,5	1,01	-	Developing
	D10	S	-	54	-	67	3000	1,91	1,00	-	-	-	
	D11	S	-	54	-	65	2540	1,61	0,92	-	-	-	
	D12	K	F	55	-	68	2840	1,71	0,90	12,9	0,45	-	Developing
	D13	S	-	51	-	60	1440	1,09	0,67	-	-	-	
	D14	S	-	49	-	56	1260	1,07	0,72	-	-	-	
	D15	S	-	60	-	71,8	3090	1,43	0,83	-	-	-	
	D16	S	-	51,8	-	61	840	0,60	0,23	-	-	-	
	D17	S	-	53	-	63,6	1440	0,97	0,56	-	-	-	
Averages							2063,8	1,37	0,76	11,7	0,61	-	
16-11-1983	P18	K	-	50,4	-	63,3	1710	1,34	0,67	1,2	0,07	-	From pond
	P19	K	-	56,0	-	66,2	1917,3	1,09	0,66	0,5	0,03	-	From pond
AVERAGES							1814	1,22	0,66	-	0,05	-	

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Table 8 . Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

(continued)

JEPARA TANK A PELLETS PLUS TRASH FISH

Date	Code	Sampled killed died	Sex	Length(cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)^3	TWX100 / (TL)^3	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
13-12-1983	A	D	M	52	-	62	950	0.68	0.40	0.47	0.49	-	Starved refused to eat
16- 1-1984	A1	S	-	60	61.5	74	3380	1.56	0.83	-	-	-	
	A2	K	F	54	56.6	67	2680	1.70	0.89	3.8	1.42	450	
	A3	K	F	55	56.4	70	3000	1.80	0.87	17.0	5.67	580	
	A4	S	-	55	56.2	65	2200	1.32	0.80	-	-	-	
Averages							2815	1.60	0.85	10.4	3.54	515	
14- 3-1984	1	S	-	54.8	56.4	70.6	3920	2.38	1.11	-	-	-	
	2	S	-	56.8	58.6	72.2	4470	2.44	1.19	-	-	-	
	3	S	-	54.2	55.0	59.4	3800	2.39	1.85	-	-	-	
	4	S	-	51.0	53.0	60.5	3090	2.23	1.40	-	-	-	
Averages							3820	2.36	1.39	-	-	-	
11- 5-1984	1	S	-	52	55.	68	4000	2.84	1.27	-	-	-	
	2	S	-	60	62.5	78	4170	1.93	0.88	-	-	-	
	3	S	-	58.5	61	74	3950	1.97	0.97	-	-	-	
	4	S	-	51.5	53	67	3000	2.20	1.00	-	-	-	
Averages							3780	2.24	1.03	-	-	-	
12- 7-1984	1	S	-	52.5	53.5	64	4930	3.41	1.88	-	-	-	
	2	S	-	54.5	56	70	6310	3.90	1.84	-	-	-	
	3	S	-	53	54.5	70	5240	3.52	1.53	-	-	-	
	4	S	-	56	58	72	4510	2.57	1.21	-	-	-	
Averages							5247.5	3.35	1.62	-	-	-	
14- 7-1984		D	M	-	-	65	3000	-	1.09	10.0	0.33	-	
15- 7-1984		D	F	-	-	60.2	3000	-	1.38	9.11	0.30		

Table 8 . Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

(continued)

JEPARA TANK A PELLETS + TRASH FISH

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	THX100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
11- 9-1984	1	S	-	57.5	60.8	72.4	6000	3.16	1.58	-	-	-	
	2	S	-	52.5	55.5	71.4	4500	3.11	1.24	-	-	-	
	3	K	M	58.0	61.5	77.0	3650	1.87	0.80	6.3	0.17	-	Very fat, belly fat 1,2 cm.
	4	K	F	50.4	53.3	66.8	2550	1.99	0.86	7.0	0.27	-	Very fat, maturing nicely
Averages							4175	2.53	1.12	-	-	-	
13-11-1984	1	S	-	51.2	54.2	66.5	2700	2.01	0.92	-	-	-	
	2	S	-	50.4	53.6	65.3	2930	2.29	1.05	-	-	-	
	3	S	-	56.2	58.5	75.0	3960	2.23	0.94	-	-	-	
	4	K	M	55.4	58.0	72.4	3680	2.16	0.97	4.5	0.12	-	Belly fat 1 cm, running milt
	5	K	M	53.0	56.5	69.5	3100	2.08	0.92	5.3	0.17	-	Belly fat 3 cm, running milt
AVerages							3274	2.15	0.96	4.9	0.14	-	

Table 8. Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.
(continued)

JEPARA TANK B PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	TWX100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
26-11-1983	B1	D											
	B2	D											
23-12-1983	B3	D	M	53		61	1450	0.97	0.64	0.65	0.45	-	No Aeration during night 22/23
	B4	D	M	57	-	66	2400	1.30	0.83	2.01	0.84	-	
	B5	D	M	54.5	-	64.5	2000	1.24	0.75	1.76	0.88	-	
	B6	D	M	57	-	66	2650	1.43	0.92	6.36	2.40	-	
	B7	D	M	58	-	69	3000	1.54	0.91	8.32	2.77	-	
	B8	D	M	55	-	66	2450	1.47	0.85	5.47	2.23	-	
	B9	D	M	57	-	66	2300	1.24	0.80	3.42	1.49	-	
Averages							2321.4	1.31	0.81	4.00	1.58	-	
16- 1-1984	B1	S	-	56.2	57	70	3200	1.80	0.93	-	-	-	
	B2	S	-	58	59	70	3200	1.64	0.93	-	-	-	
	B3	K	F	57	58	71	3100	1.67	0.87	9.8	3.16	525	
	B4	S	-	55	56.4	68	2900	1.74	0.92	-	-	-	
	B5	K	F	56	57	66	2600	1.48	0.90	7.5	2.88	445	
Averages							3000	1.67	0.91	8.6	3.02	-	7 fish added from pond 23/1
14- 3-1984	1	S	-	55.6	57.4	69.0	5640	3.28	1.72	-	-	-	
	2	S	-	51.4	52.0	63.2	3090	2.28	1.22	-	-	-	
	3	S	-	50.6	52.0	57.8	2960	2.28	1.53	-	-	-	
	4	S	-	55.0	57.0	59.0	3320	2.00	1.62	-	-	-	Blind in right eye
Averages							3752.5	2.46	1.52	-	-	-	
11- 5-1984	1	S	-	56	57	69	3500	1.99	1.07	-	-	-	
	2	S	-	60	62	74	3950	1.83	0.97	-	-	-	
	3	S	-	56.5	58	72	3400	1.88	0.91	-	-	-	
	4	S	-	55	56.3	70	2950	1.77	0.86	-	-	-	
Averages							3450	1.87	0.95	-	-	-	

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Table 8. Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.
(continued)

JEPARA TANK B PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	THX100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
12- 7-1984	1	S		58	61	74	4670	2.39	1.15	-	-	-	
	2	S		62	64	78.3	4060	1.70	0.85	-	-	-	
	3	S		50	53	80	3320	2.66	0.65	-	-	-	
	4	S		55	57.5	75	2950	1.77	0.70	-	-	-	
Averages							5750	2.13	0.84	-	-	-	
13- 7-84		D	F			58	4000	-	2.05	19	0.48	-	
11- 9-1984	1	S		48.0	51.0	64.2	3640	3.29	1.38	-	-	-	
	2	S		53.0	55.0	70.3	2870	1.93	0.83	-	-	-	
	3	K	M	52.0	55.5	69.3	3720	2.65	1.12	-	-	-	Very fat, not maturing
	4	K	F	55.3	58.8	74.0	2670	1.58	0.66	12.4	0.48	-	Very fat, maturing nicely
Averages							3225	2.36	1.00	-	-	-	
13-11-1984	1	S	-	56.0	58.0	71.0	3300	1.88	0.92	-	-	-	
	2	K	M	58.0	62.0	77.0	4600	2.36	1.01	12.4	0.27	-	Belly fat 2 cm, running milt Pentax 28-32/13/11/84
	3	S	-	58.5	60.6	77.5	3900	1.95	0.84	-	-	-	
	4	K	F	54.7	56.8	71.8	3600	2.05	0.97	36.0	1.00	-	Belly fat 1 cm ovary granolated Pentax 31-32/13/11/84
	5	S	-	55.5	60.5	71.7	3770	2.21	1.02	-	-	-	
Averages							3834	2.09	0.95				

Table 8 . Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

(continued) JEPARA TANK C PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	TWX100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
3 - 1 1984	C1	D	M	56	-	69	2600	1.48	0.79	1.75	0.67	-	
4 - 1-1984	C2	D	F	53	-	65	1750	1.18	0.64	4.08	2.33	-	No electricity no aeration, O_2 = 1.9 ppm
	C3	D	F	53	-	58	2000	1.34	1.03	4.50	2.25	-	
	C4	D	M	57	-	69	3200	1.73	0.97	2.10	0.66	-	
	C5	D	F	55	-	65	2400	1.44	0.87	2.80	1.17	-	
	C6	D	M	55	-	65	2500	1.50	0.91	1.00	0.40	-	
	C7	D	F	50.2	-	58?	2800	2.21	?	46.5	16.61	-	
	C8	D	M	54	-	64	2600	1.65	0.99	1.2	0.46	-	
	C9	D	F	55	-	62	2300	1.38	0.97	9.0	3.91	-	
	C10	D	M	59	-	69	2600	1.27	0.79	1.8	0.69	-	
	C11	D	M	55	-	66	2400	1.44	0.83	2.1	0.88	-	
	C12	D	F	60	-	72	2750	1.27	0.74	13.1	4.76	-	
	C13	D	F	54	-	63	2250	1.43	0.90	13.8	6.13	-	
	C14	D	M	50	-	62	1600	1.28	0.67	2.0	1.25	-	
	C15	D	M	54	-	63	2100	1.33	0.84	1.0	0.48	-	
	C16	D	F	56	-	68	2300	1.31	0.73	6.7	2.91	-	
	C17	D	F	56	-	68	2450	1.40	0.78	9.7	3.96	-	
	C18	D	M	58	-	70	2300	1.18	0.67	2.8	1.22	-	
	C19	D	M	51	-	58	1950	1.47	1.00	3.6	1.85	-	
	C20	D	M	55	-	65	2500	1.50	0.91	2.9	1.16	-	
Averages							2355.3	1.44	0.85	-			
													Tank C restocked 23/1/1984

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Table 8. Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

(continued) JEPARA TANK C PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	TWx100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine length (cm)	Remarks
14-3-1984	1	S	-	55.6	57.0	60.0	3500	2.08	0.99	-	-	-	
	2	S	-	55.0	57.4	71.0	3480	2.09	0.97	-	-	-	
	3	S	-	53.0	55.0	67.0	2760	1.85	0.92	-	-	-	
	4	S	-	51.8	53.4	65.6	3370	2.42	1.23	-	-	-	
Averages							3297.5	2.11	1.03				
5-4-1984		D	F	50	-	60.2	2800	2.24	1.28	9.1179	3.26	-	Died 5/4/1984
6-4-1984		D	F	60	-	75.6	3900	1.81	0.90	8.7337	2.24	-	Died 6/4/1985
11-5-1984	1	S	-	53.5	55	67	3100	2.02	1.03	-	-	-	
	2	S	-	61	63	77	4350	1.92	0.95	-	-	-	
	3	S	-	54	61	73	3800	2.41	0.98	-	-	-	
	4	S	-	55	57	71	2850	1.71	0.80	-	-	-	
Averages							3525	2.02	0.94	-	-	-	
12-7-1984	1	S	-	59	63	74	5000	2.43	1.23	-	-	-	
	2	S	-	54	56	65	3700	2.35	1.35	-	-	-	
	3	S	-	53.5	55	67	3800	2.48	1.26	-	-	-	
	4	S	-	53	55.5	68	3600	2.42	0.97	-	-	-	
Averages							4025	2.42	1.20	-	-	-	
16-7-1984		D	F	-	-	57.6	3900	-	2.04	8.73	0.22	-	DIED 16/7/84
17-7-1984		D	-	-	-	-	-	-	-	-	-	-	DIED 17/7/84

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Table8 . Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

(continued) JEPARA TANK C PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length(cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)^3	THX100 / (TL)^3	Gonad Wt (g)	GWx100 / TW	Intestine length (cm)	Remarks
11- 9-1984	1	K	M	52.5	55.0	68.5	3000	2.11	0.93	4.0	0.13	-	Very fat, regressing gonad
	2	S	-	59.5	62.8	73.1	4250	2.02	1.09	-	-	-	
	3	S	-	57.0	60.3	76.0	4250	2.29	0.97	-	-	-	
	4	K	F	60.0	63.0	78.5	4390	2.03	0.91	101.0	2.30	-	Very fat, ovary granular, egg diameter 0.2mm, photo-DR Chorn Lim 1-2/1130/11/9/84. DR Chorn Lim
Averages							3972	2.11	0.98				
13-11-1984	1	K	F	59.5	61.0	71.0	3640	1.73	1.02	28.29	0.78	-	Belly fat 1.5 cm, ovary granulated
	2	S	-	60.2	64.0	80.5	4520	2.07	0.87	-	-		
	3	S	-	55.3	57.0	73.0	3900	2.31	1.00	-	-	-	
	4	S	-	62.4	64.5	80.0	4650	1.91	0.91	-	-	-	
	5	K	F	59	61.5	73.7	4470	2.18	1.11	182.2	4.08	-	Belly fat 1.0 cm, ovary granuleted Pentax 33-36/13/11/1984
Averages							4236	2.04	0.98	-	-	-	
14-11-1984		D	F	63	64	79	4270	1.71	0.87	72.5	1.70	-	

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Table 8: Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.

(continued) JEPARA TANK D PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length (cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)³	TWX100 / (TL)³	Gonad Wt (g)	GWx100 / TW	Intestine Length (cm)	Remarks
?	D	D											
16 - 1-1984	D1	S		50.4	51.2	62	2050	1.60	0.86				
	D2	K	F	53.2	54.6	65	2200	1.46	0.80	11.8	5.36	486	
	D3	S		55	56.4	68.6	2400	1.44	0.76	-	-	-	
	D4	K	M	57	58.4	69.4	2900	1.57	0.90	9.7	3.34	405	
	D5	S	-	50	51	61	2000	1.60	0.88	-	-	-	
	D6	K	F	51.2	52.4	61	2100	1.56	0.93	6.5	3.10	360	
	D7	K	F	54	55	66	2250	1.43	0.79	-	-	390	
Averages							2271.4	1.52	0.85				
14 - 3-1984	1	S	-	51.8	53.8	68.0	2050	1.47	0.65	-	-	-	
	2	S	-	51.8	53.2	66.0	2080	1.50	0.72	-	-	-	
	3	S	-	48.2	50.0	59.4	1700	1.52	0.81	-	-	-	
	4	S	-	48.0	49.8	61.4	1930	1.75	0.83	-	-	-	
	5	S	-	48.7	51.4	62.0	2000	1.73	0.84	-	-	-	
	6	S	-	56.6	58.8	70.0	3650	2.01	1.06	-	-	-	
Averages							2235	1.66	0.82	-	-	-	
11 - 5-1984	1	S	-	53	55	66	2700	1.81	0.94	-	-	-	
	2	S	-	54.5	56	68	2450	1.51	0.76	-	-	-	
	3	S	-	52.5	54	67	2550	1.76	0.85	-	-	-	
	4	S	-	54	56	70	2400	1.52	0.70	-	-	-	
	5	S	-	51.5	53	66	2400	1.76	0.83	-	-	-	
Averages							2500	1.67	0.82				

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Table 8 . Sex, weight, standard, fork and total lengths, condition factors, gonad weight, gonado-somatic index and intestine length of fish which died, were killed or sampled and returned to tanks on various dates.
(continued)

JEPARA TANK D PELLETS ONLY

Date	Code	Sampled killed died	Sex	Length(cm) SL	FL	TL	Weight (gm)	TWx100 / (SL)3	THX100 / (TL)3	Gonad Wt (g)	GWx100 / TW	Intestine length (cm)	Remarks
12- 7-1984	1	S	-	57	62	78	4200	2.27	0.89	-	-		
	2	S	-	50	53	63	2420	1.94	0.97	-	-	-	
	3	S	-	50	53.5	65.5	2620	2.10	0.94	-	-	-	
	4	S	-	55	56.5	71	3290	1.98	0.92	-	-	-	
	5	S	-	53	54	65	3500	2.35	1.27	-	-	-	
	6	S	-	51	53.5	67.5	3200	2.41	1.04	-	-	-	
Averages							3205	2.18	1.00				
11- 9-1984	1	S	-	46.4	48.5	60.0	2050	2.05	0.95	-	-	-	
	2	K	M	59.8	62.0	75.5	3200	1.50	0.74	3.8	0.11	-	Normal belly fat, Goned regressin or mal formed.
	3	S	-	52.2	55.0	68.8	2800	1.97	0.86	-	-	-	
	4	K	F	52.0	55.5	67.3	2350	1.67	0.77	7.8	0.33	-	Normal belly fat, gonad developin
Averages							2600	1.80	0.83				
27-10-1984	-	D	-	53.0	55.0	60.0	2500	1.68	1.15	-	-	-	found dead in tank 27/10/84
13-11-1984	1	S	-	53.3	55.5	69.0	3270	2.16	1.00	-	-	-	
	2	S	-	48.7	51.7	65.0	2500	2.16	0.91	-	-	-	
	3	S	-	45.3	49.7	62.0	2150	2.31	0.90	-	-	-	
	4	S	-	48.6	50.7	65.0	2340	2.04	0.85	-	-	-	
	5	K	F	52.2	54.0	69.0	2900	2.04	0.88	116.0	4.00	-	Very yellow, granulated, well developed ovary
	6	K	F	49.0	51.6	65.5	2500	2.12	0.98	10.0	0.40	-	
Averages							2610	2.14	0.92				

Water to each tank was to be by a flow through system with flow regulated to exchange one third of the water volume in each tank daily. Water temperature, salinity and disolved oxygen in each tank was to determined each morning and afternoon.

Feeds were to formulated by Dr. Chhorn Lim and freshly prepared as 3 mm diameter pellets at Jepara weekly. The pellets were not to contain antioxidants but were to contain: 3000-3600 Kcal of metabolizable energy/kg; vitamin; minerals; minimum of 50% fish oil; maximum of 50% corn oil; etc.

Feed regime for the first 2 months (to mid-January 1984) was to be 3% (dry water) of body weight/day as follows : fish on pellets only(tanks B,C and D) 1.5% in morning and 1.5% in afternoon; fish on pellets plus trash fish (tank A) 1.5% trash fish in the morning and 1.5% pellets in the afternoon.

For a more complete report of the beginning of this experiment please refer to Dr. Chhorn Lim's F 3a section of his October/ December 1983 quarterly report to RMI. It is attached to this report as Appendix I.

The experiment at Jepara was terminated during the past quarter with final sampling 13 November. All but one of the remaining fish have been transfered to Gondol (see section I.A.b.2. above). In total we obtained: 3 fish from the pond system at Jepara; 12 from tank A; 12 from tank B; 7 from tank C; and 33 from tank D. We left one blind fish in tank D. This accounts for 65 fish, including the 7 transported to Gondol 27/28 October from tank D, in the experimental tanks at the end of the experiment. From my calculations (Appendix J) we should have had : 11 fish in tank A; 11 in tank B; 11 in tank C; and 42 in tank D; or a total of 75 fish.

The biological data of fish which were : sampled and returned to the experimental tanks; killed; or died during the experiment is tabulated in Table 8.

Ovarian development of some of these fish occured during the experiment with egg diameters reaching 0.2 to 0.3 mm. Fully mature, hydrated, milkfish eggs have diameters of approximately 1.2 mm. Males with running milt were obtained but it was not determined whether or not the milt was motile (Figures 6 to 11).

Incomplete hydrographic and nutritional data and feeding regimes are attached as Appendix J. Complete hydrographic data was not available from Jepara as they had lost some of it. Dr. Chhorn Lim has the complete nutritional data and feeding regimes.

II. RABBIT FISH

Messers Tridjoko, Agus Prijono and I Nyoman Adiasmara Giri together with their four technicians have collected and maintained stocks of 3 species of Siganids or rabbit fish since late 1983. Siganids are locally called sadar and the local fishermen further divide the sadar into 3 groups : Sadar Kuning; Sadar Biasa; and Sadar Beronang. Each of the 3 groups of sadar consist of 2 or more types or species. These researchers have tentatively identified the species now stocked at Gondol as : Siganus virgatus; S. canaliculatus; and S. chrysospilos but until positively identified I have insisted that they be refered to as : Sadar Kuning Type I; Sadar Biasa Type I; and Sadar Beronang Type I respectively. Photos of Sadar Kuning Type I are included herein as Figures 12 to 15. Photos of Sadar Biasa Type I are included herein as Figures 16 to 19. Unfortunately we lost our stocks of Sadar Beronang Type I in January before we obtained their photographs.

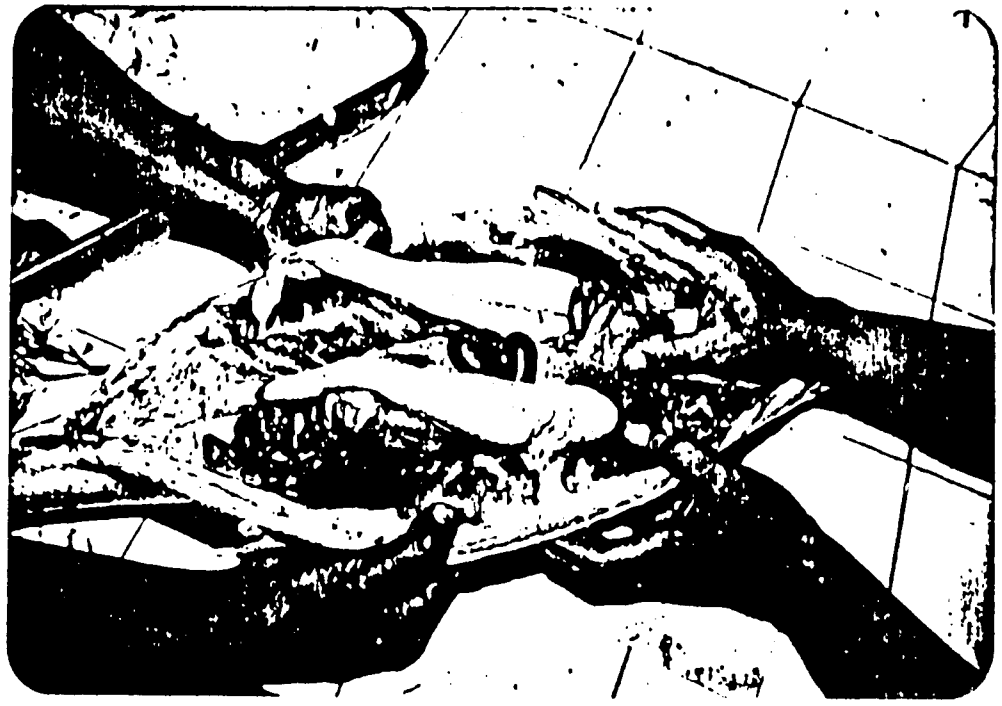

Figure 6 . Body cavity of female milkfish from tank C, Jepara, sampled 11/9/84 with developing gonads. (Chhorn Lim 1030/11/9/84)

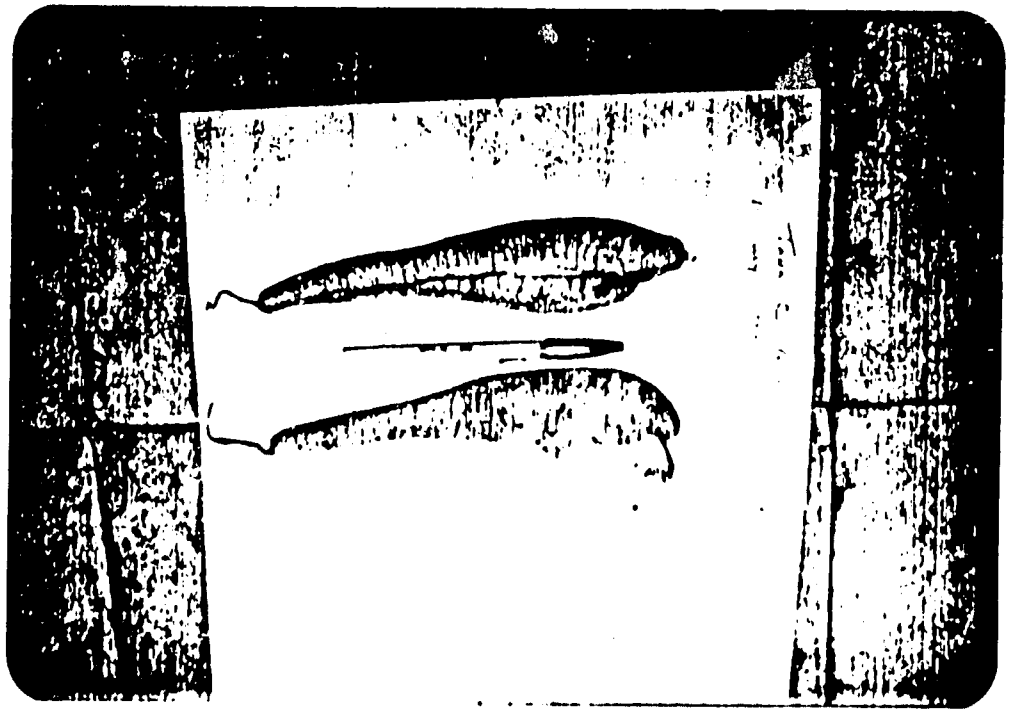

Figure 7 . Gonads from female in Figure . Total gonad weight 101 g with developing eggs with mean diameter of 0.2 mm. (Chhorn Lim 1030/11/9/84)

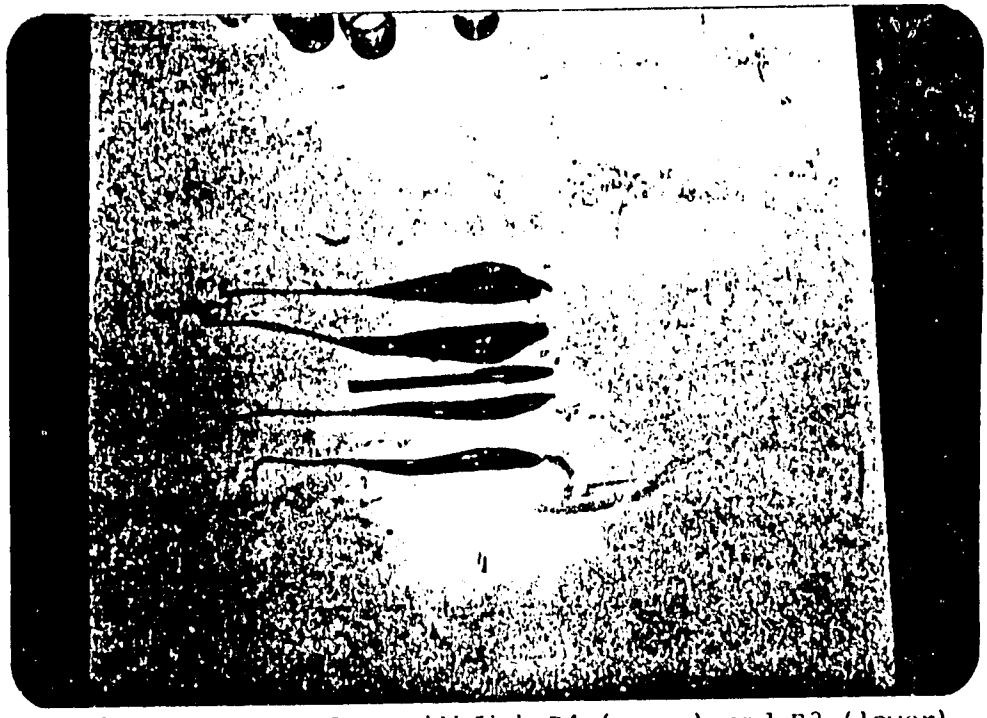

Figure 8 Gonads from milkfish B4 (upper) and B2 (lower) killed at Jepara 13 November 1984. (Vanstone, Pentax 31/13/11/84)

Figure 9 . Body cavity of milkfish C5 killed at Jepara 13 November 1984. (Vanstone, Pentax 34/13/11/84).

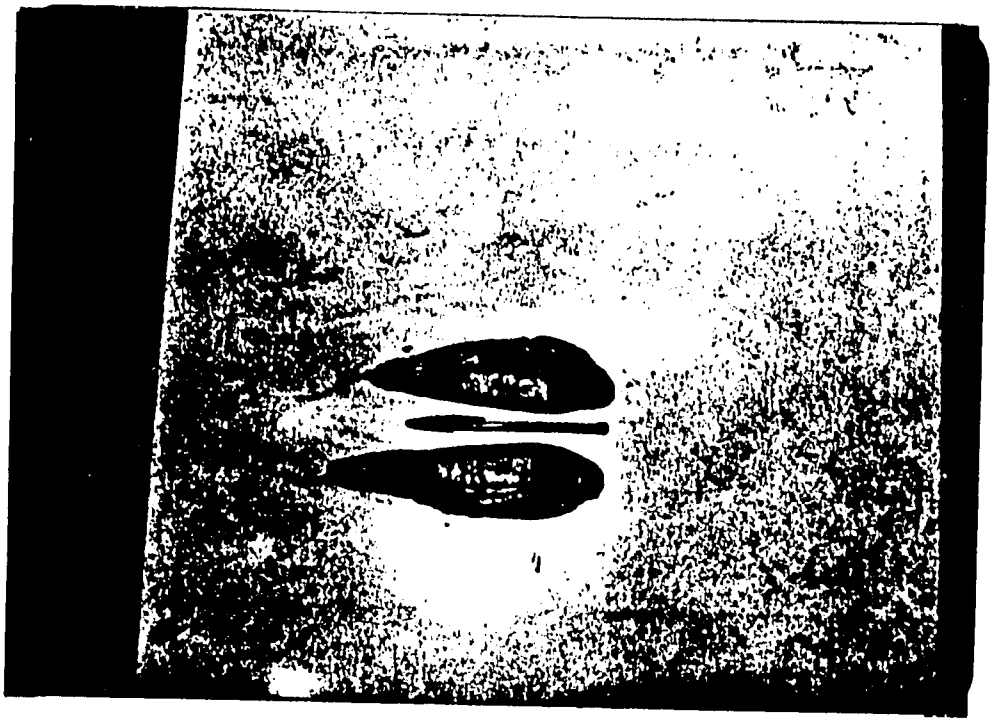

Figure 10 . Ovary from milkfish C5 killed at Jepara 13 November 1984, dorsal view (Vanstone, Pentax 35/13/11/84)

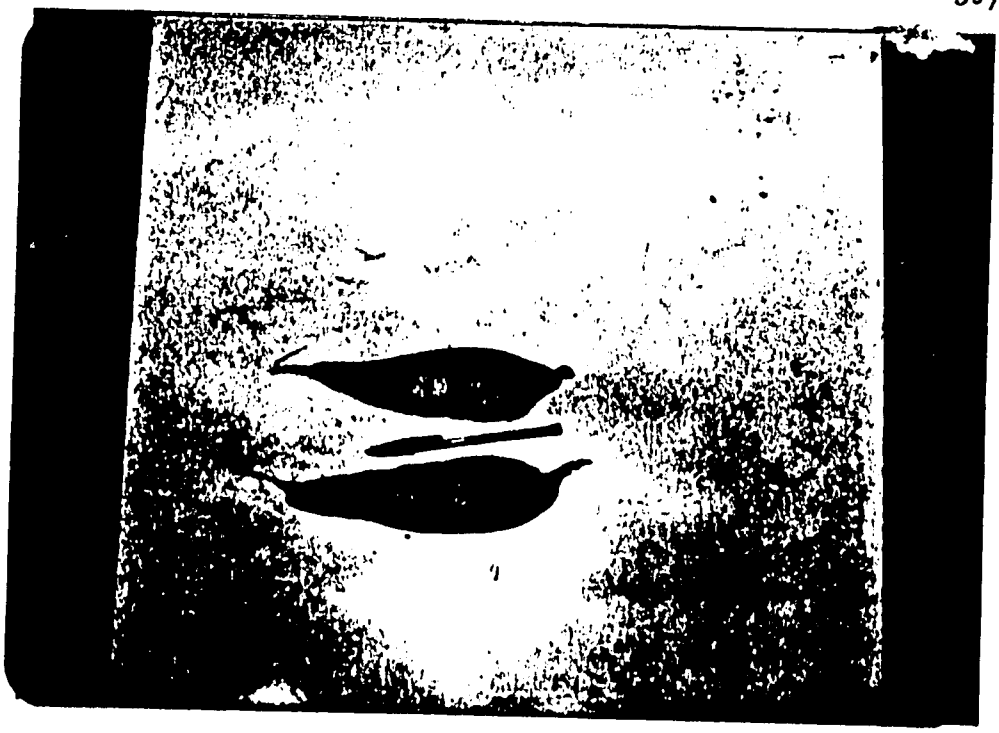

Figure 11 . Ovary from milkfish C5 killed at Jepara 13 November 1984, ventral view. (Vanstone, Pentax 36/13/11/84)

Figure 12. Sadar Kuning Type I.(Vanstone, Pentax 20/0830/15/2/84)

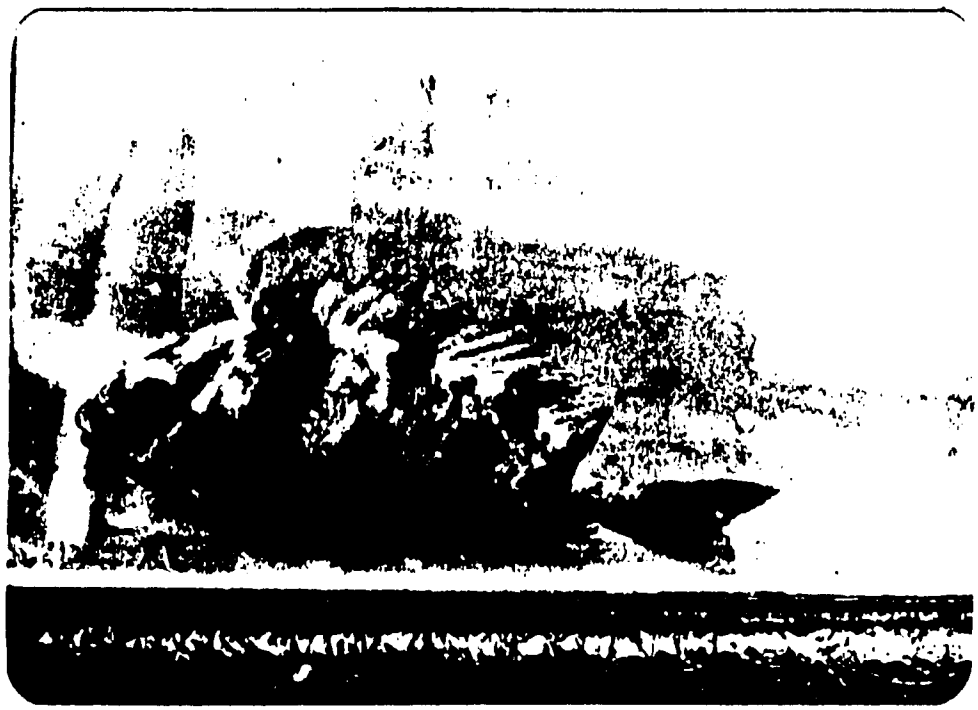

Figure 13 . Color variation of the same fish in Figure (Vanstone, Pentax 21/0830/15/2/84)

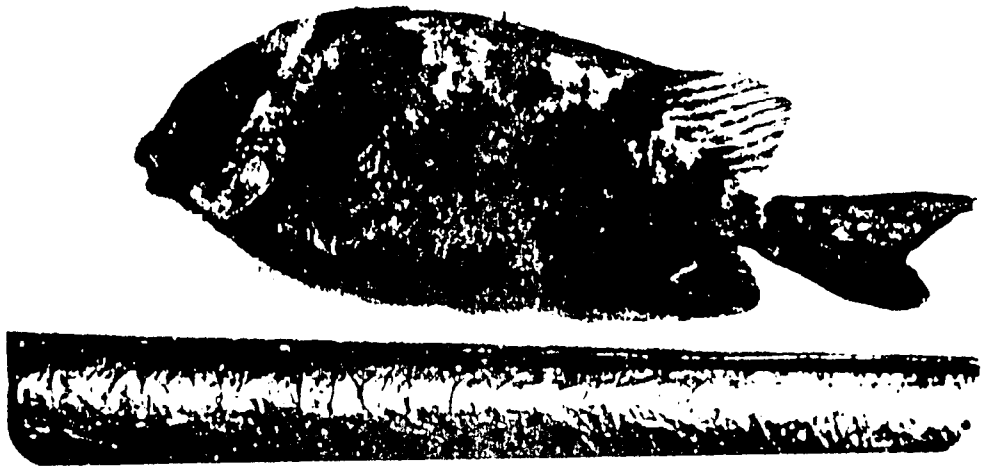

Figure 14. A different speciman of Sadar Kuning Type I than that illustrated in Figures and . (Vanstone, Pentax 10/0900/15/2/84)

Figure 15. Color variation of the same fish in Figure . (Vanstone, Pentax 14/0900/15/2/84)

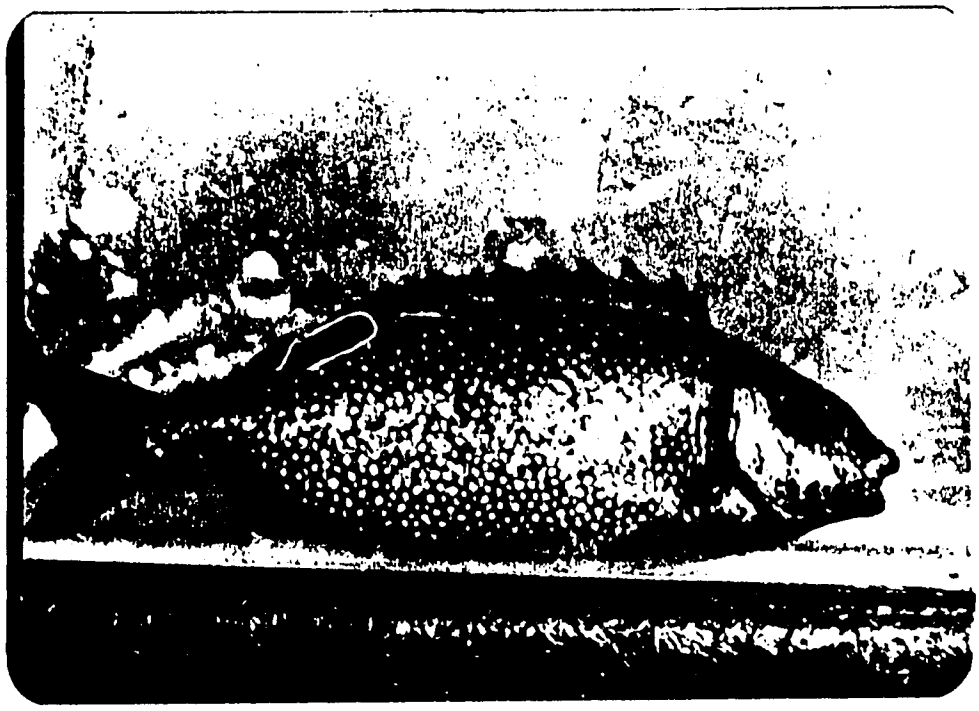

Figure 16. Sadar Biasa Type I. (Vanstone, Pentax 30/0830/15/2/84)

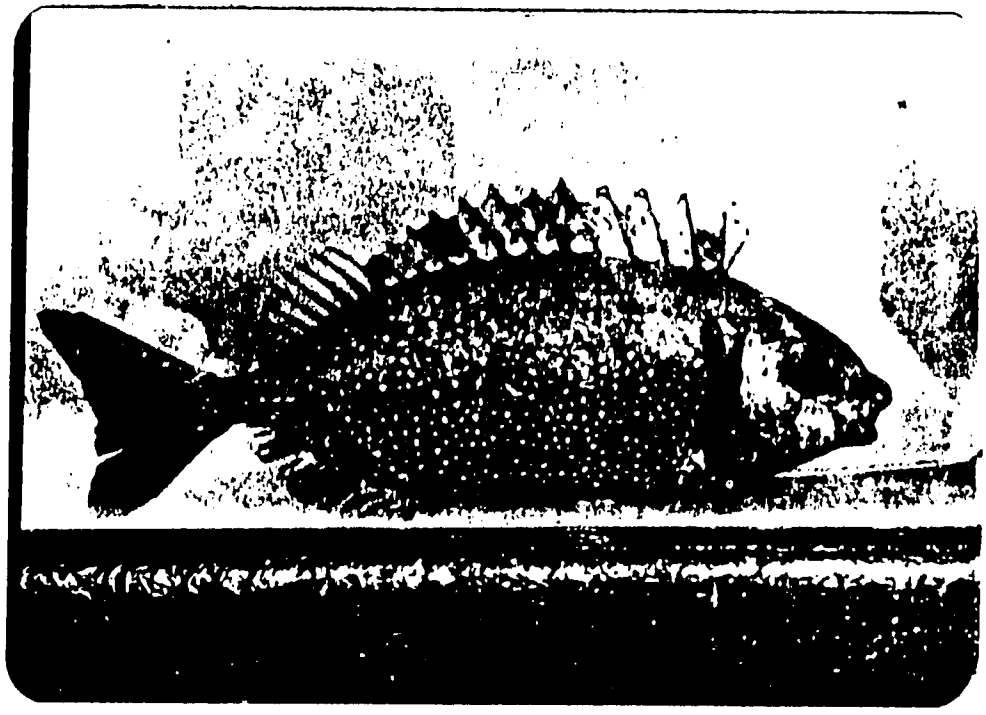

Figure 17. Color variation of the same fish in Figure (Vanstone, Pentax 36/0830/15/2/84)

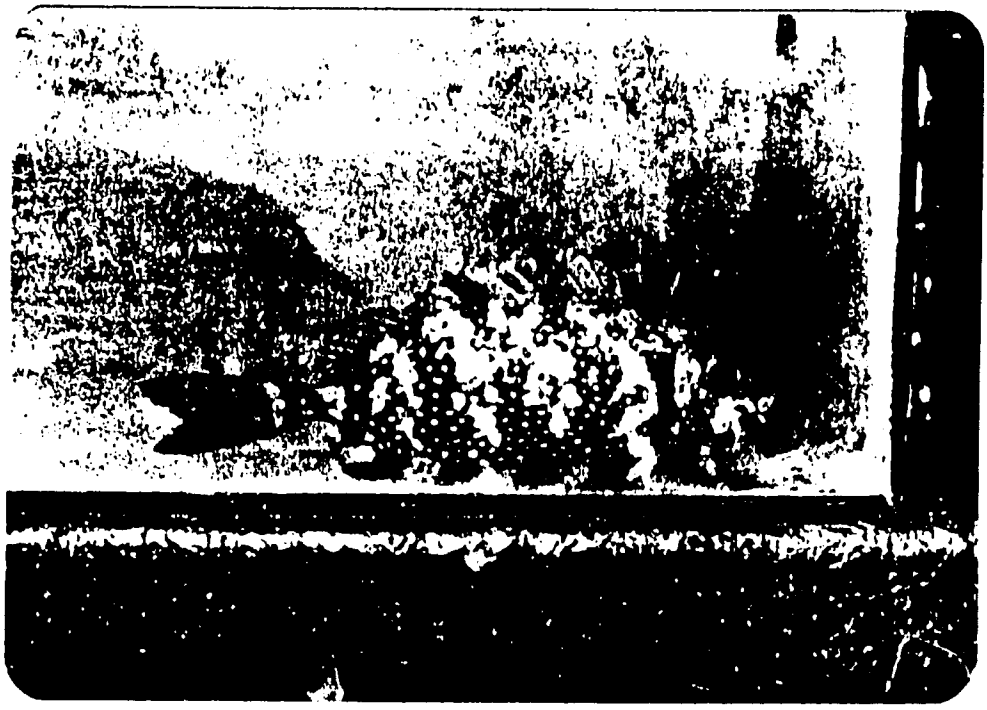

Figure 18. A different speciman of Sadar Biasa Type I than that illustrated in Figures and (Vanstone, Pentax 20/0900/15/2/84)

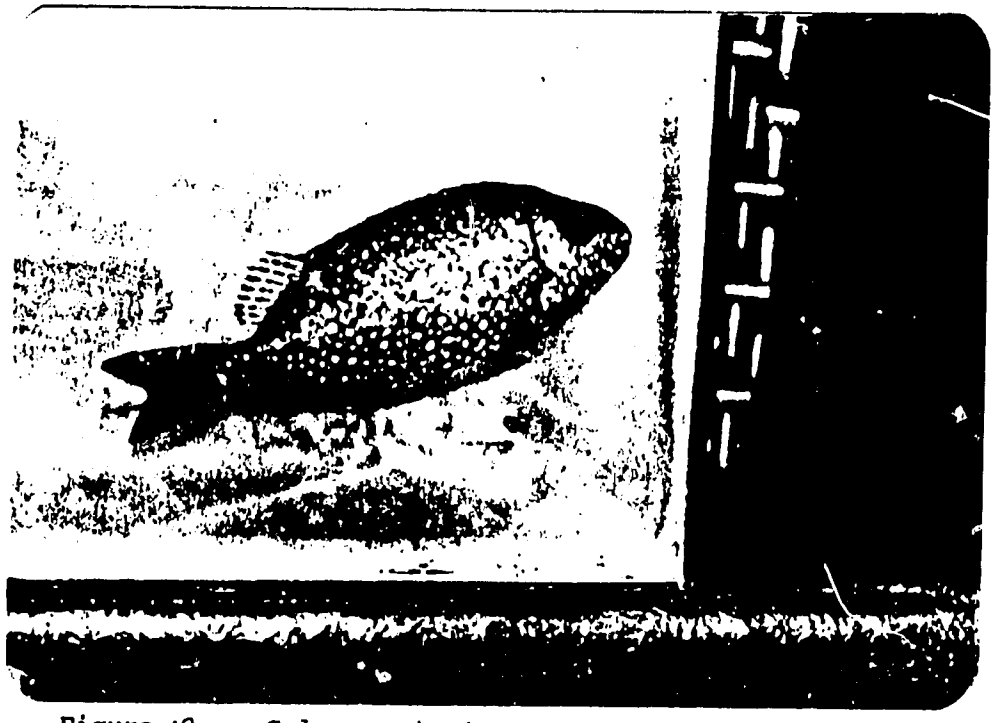

Figure 19 . Color variation of the same fish in Figure . (Vanstone, Pentax 28/0900/15/2/84)

To date each tank containing Sadar has been provide with continously flowing sea water and continuous aeration. Feeding of these fishes has been identical to that of our future milk-fish broodstock (section I.A.b.1).

As of 31 December we had : 9 adult Sadar Kuning Type I in tank A1 and 10 in tank A2; 8 adult Sadar Biasa Type I in tank A3 and 10 in tank A4; 10 Sadar Beronang Type I in tank A5 and 10 in tank A6. Additionally we had: 6 adult and 1 juvinile Sadar Biasa Type I in tank S5; 6 juvinile Sadar Beronang in tank S6; and 7 small sadar of mixed types in tank S7. In total we had 77 rabbit fishes in excellent condition.

Between 6 August 1984 and 31 January 1985 (this is being written 3 February) these fish have spawned 18 times (Table 9). Of major importance is the fact that all spawnings have been within 4 days of first quarter moon phase. Unfortunately, for sometimes known but more often unknown reasons, we have been unable to rear the larvae past day 4.

Their quarterly reports for this sub-activity are attached as Appendicies K, L and M.

III. OTHER FIN FISHES

III.A. RUNAH PUTIH

On 5 occasions during the last quarter of 1983 we collected sexually mature small fish that are called locally runah putih or just runah. Evidently a second type of runah "runah kencan" is also present in Gondol waters. Runah putih appears similar to the guno from Filipino waters which is one of the silver-sides in English or Preneus pinqis

Table 9 . Spawning of Siganids (Sadar Kuning Type I, Sadar Biasa Type I and Sadar Beronang Type I) at Gondol 6 August 1984 - 31 January 1985.

Date		Days before (+) or after(-) 1st quarter	Sadar	From tank*	Days longest surving larva lived	Remarks
Spawning	Moon in 1st quarter					
6/8/84	3/8/84	+3	Kuning	A1	3	No feeds available
		+3	Kuning	A2	3	No feeds available
		+3	Biasa	A3(B1)	-	Did not hatch
29/9/84	1/10	-2	Beronang	A5(C1)	4	
3/10		+2	Kuning	A1	3	
		+2	Kuning	A2	3	
		+2	Biasa	A3(B1)	3	
2/11	31/10	+2	Kuning	A1	4	
		+2	Kuning	A2	4	
3/11		+3	Biasa	A3(B1)	3	
3/12	30/11	+3	Kuning	A1	0	
		+3	Biasa	A3(B1)	0	
25/12	29/12	-4	Biasa	A4(B2)	-	Did not hatch
27/12		-2	Beronang	A5(C1)	-	Did not hatch
		-2	Beronang	A6(C2)	3	
30/1/85	28/1/85	+2	Kuning	A1	4	
		+2	Biasa	A3(B1)	4	
31/1		+3	Kuning	A1 or A2**	0	Water turned off after hatching

*Previous code numbers of these tanks is in parenthesis.

**The Sadar Kuning in tanks A1 and A2 were combined in one tank prior to spawning.

I was most interested in obtaining this fish for if it is the same as, or similar to, guno it is very easy to spawn and there is usually no problem in rearing the larvae. In fact in the Philippines it spawns throughout the year and I have used it in the past to train all new staff on: capture and handling of sexually mature fish; spawning; embryonic development; hatching and larval rearing. It is a small easy to handle fish that usually spawns naturally in the evening of the day of capture and the eggs take 24 to 30 hours to hatch.

Following collection of the adult runah we placed 20 to 30 fish in each of several type H tanks (rectangular 100 x 60 x 49 cm deep) containing 40 cm sea water and "bunches" of artificial sea weed I had had prepared from polypropolene rope for the eggs to adhere to. In 4 out of the 5 collections spawning occured during the night of the day following collection. We did not have a microscope at the time to determine whether not embryonic development occured. For some unknown reason none of the eggs hatched.