

SUMATRA AGRICULTURAL RESEARCH

497-0263

EVALUATION

USAID Grant No. 497-0263

USAID Loan No. 497-T-048

January 27, 1986

A.T.D. EVALUATION SUMMARY PART I

(BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS)

A. REPORTING A.I.D. UNIT (Mission or AID/W Office) **US : USAID/Indonesia**

B. WAS EVALUATION SCHEDULED IN CURRENT FY ANNUAL EVALUATION PLAN? **yes slipped ad hoc**

C. EVALUATION TYPE: **interim final ex post other**

D. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program (s) evaluated: if not applicable, list title and date of the evaluation report)

Project #	Project/Program Title (or title & date of evaluation report)	First PFCAS or equivalent (FY)	Most recent PFCAS (mo/yr)	Planned CP Cost ('000)	Amount Obligated to Date ('000)
497-0263	Sumatra Agricultural Research	09/29/77(G) 04/12/78(L)	04/12/86	2500(G) 7000(L)	2500(G) 7000(L)

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

Action(s) Required	Name of officer responsible for Action	Date Action to be Completed
1. Encourage AARD to conduct in-country seminars, workshops, conferences and short training courses which utilizes experienced researchers as trainers to transfer their planning and management skills to the younger staff members.	AARP Project Officer	Throughout the 1986-1992 Project life
2. Work with the AARD training program to ensure that qualified personnel are sent to courses in agriculture economics and plant protection.	AARP Project Officer	Throughout the 1986-1992 Project Life
3. Ensure that equipment operators and maintenance personnel are included in training programs.	AARP Project Officer	Throughout the 1986-1992 Project life
4. Investigate possibility of SARIF organizational structure modification to place research support under the Director of Research as well as the analytical laboratory, computers, statistical laboratory, experimental farms and research stations.	AARP Project Officer	1986
5. Encourage AARD staff to actively fill all postings at field stations.	AARP Project Officer	1986-87
6. Include assistance to maintenance/operation of physical plant/vehicles in AARP expatriate TOR.	AARP Project Officer (Attachments)	1986 (if necessary)

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION: **30** day **1986** year

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

Signature Typed Name	Project/Program Officer Joane T. Hale	Representative of Borrower/Grantee Dr. Syarifudin	Evaluation Officer T. Mahoney	Mission or AID/W Office Director William P. Fuller
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7. Discourage additional construction activities which would further reduce scarce GOI operational funds. Actively encourage sufficient recurrent funds to fully operationalize those research sites already in place.

8. Review progress towards closer collaboration between C.S.R./Trop Soils and SARIF.

AARP Project Officer

1986-9

9. Continue to provide technical assistance to AARD.

AARP Project Officer

1986-9

The project purpose is to help the Government of Indonesia to expand and improve the agricultural research network in Sumatra, in order that the research system might more effectively address food crops production issues specifically related to Sumatra agro-climatic conditions. The project initially implemented by the Central Research Institute for Food Crops (CRIFC) and later this responsibility transferred to the Sukarami Research Institute for Food Crops (SARIF) which was established in 1980. This final evaluation was conducted by an independent consultant team on the basis of project documents, visits to 7 research stations, and interviews with project personnel.

The major findings and conclusions were :

- o. SARIF is well underway to becoming an effective agricultural research institute. It is adequately provided with physical facilities and, with the return of personnel who are in training for advanced degrees, will have a well rounded staff.
- o. The support services unit is still the weakest element in SARIF.
- o. Funds are inadequate to support the research programs that are being planned for the six experiment stations directly under SARIF and for the proper maintenance of infrastructure and related activities which support the research program.

It was recommended that the organizational structure of SARIF be modified to add a position of Director of Research and to group related functions. Urgent steps must be taken to complete the farm for experimental use by the end of 1986. Training for the support service staff is urgently needed and provision should be made for this training in the extension of the AARP project.

The evaluator noted the following lesson:

- o. The training of the support services staff should be given attention comparable to training for the scientists.
- o. It is absolutely essential for the success of any research institute program that adequate operating funds be provided.

I. EVALUATION COSTS

1. Evaluation Team

Name	Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (US\$)	Source of Funds
1. Dr. Francis J. Le Beau, Consultant		30	10,000	Project funded
2. Dr. Robert F. Chandler, Consultant		30	10,000	Project funded
3. Dr. Sadikin Sumintawikarta		30	3,000	Project funded
4. Dr. Didi Admadelaga		30	3,000	Project funded

2. Mission/Office Professional Staff Person Days (estimate) 20

3. Borrower/Grantee Professional Staff Person-Days (estimate) 30

U.S. D. EVALUATION SUMMARY PART II

J. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS (Try not to exceed the 3 pages provided) Address the following items:

- o Name of mission or office
- o Purpose of activity (ies) evaluated
- o Purpose of the Evaluation and Methodology Used
- o Findings and Conclusions
- o Recommendations
- o Lessons learned

Agricultural Research and Planning Division of the Office of Agriculture and Rural Development - USAID/INDONESIA

Purpose of Activity Evaluated.

The purpose of the Sumatra Agricultural Research Project (SARP) is to expand and improve agricultural research on food crops to address agro-climatic factors peculiar to Sumatra by developing a network of research stations and experimental farms in Sumatra. The network consists of nine research stations and experimental farms.

In 1980, the Sukarami Research Institute for Food Crops (SARIF) was created with Sukarami as the principal center. Five of the research stations and experimental farms were grouped with the Sukarami center and experimental farms to form the SARIF network. The SARP contributed to SARIF's growth and development through development of physical facilities, training, and provision of technical assistance.

Purpose of Evaluation was to assess:

- The overall capability and performance to date of SARIF to do research in the areas which constitute its mandate;
- The capability and demonstrated performance of SARIF to evaluate its achievements and to readjust its programs in lights of emerging priorities;
- Quality and impact of the program development in research conducted in SARIF during the SAR project, especially in areas where long-term and short-term expatriate staff were provided to SARIF;
- The adequacy of physical development of SARIF (building, land development, laboratories and equipments) to support its research objectives.
- Training of Indonesian personnel and building of the necessary manpower needed for the SARIF network.

Methodology

Evaluation methods used consisted of joint SARIF/USAID meetings throughout the one month evaluation process, as well as site visits to seven locations, formal interviews, meetings with SARIF staff, review of all project related documents, meeting with the Governor of West Sumatra, and an USAID-AARD internal final debriefing session.

Findings and conclusions

1. The original SAR Project activities were completed except for the development of farms for experimental use.

Date this summary prepared:

SUMMARY

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2. Some confusion exists as to the precise mandate of SARIF. A mandate for SARIF has been prepared, though it appears to overlap with the mandate for other Indonesian agricultural research institutions.
3. Training of scientists for advanced degrees is progressing as rapidly as qualified candidates become available. The existing staff, when augmented by some 40 individuals who will receive advanced degrees within the next two years, will provide, with few exceptions, a well-rounded staff. A special effort will still be required to develop additional personnel in the fields of agricultural economics and plant pathology.
4. Time and expense involved in travelling from the headquarters at Sukarami to the various experiment stations is high. Every effort should be made to post as many as possible of the research scientists at the outlying stations.
5. One of the weakest elements in SARIF is the "general services" unit which maintains the buildings and grounds, including machinery and equipment.
6. Construction and development of physical facilities which are completed and/or scheduled for completion shortly are well conceived and should be adequate for the next 5-10 years.
7. A proposed international research and training center for upland rice at Sitiung would severely strain the administrative and management capabilities of SARIF, which is still in the process of consolidating its network of stations and programs.
8. Most of the experimental fields of the experiment stations of SARIF have not been prepared for use. Roads, drainage ditches, and leveling remain to be done. All experimental fields are small as compared with the size of the planned research staff as well as the physical plant that has already been built on most of the stations.
9. Collaboration with the C.S.R./TROPISOILS team in the Sitiung area is inadequate. Joint planning of projects would reduce duplication and result in mutual reinforcement of programs.
10. Funds are inadequate to support the research programs that are being planned for the six experiment stations directly under SARIF, as well as for the proper maintenance of infrastructure and related activities which support the research program.
11. The technical assistance provided to SARIF under the SAR Project by IADS/Winrock has been successful and significantly contributed to SARIF's development. Continuing technical assistance in selected areas during the next five years is necessary to consolidate advances made and to move ahead in developing and implementing research programs.

Recommendations:

1. The following mandate is recommended for SARIF: (1) upland rice, (2) high-elevation rice, and (3) farming systems for the humid tropics. Although it is recognized that SARIF's mandate is national in scope, its research programs should be restricted to its current geographic coverage for the next five years. Placing its programs on a solid organizational and operational basis should be the primary objective during this early period. SARIF should undertake plant breeding only with rice; other crops included in the farming systems research program should be those developed at other institutions.

2. Because most of the scientists of SARIF have only recently returned from advanced study toward the M.Sc. or Ph.D. degrees, it is recommended that arrangements be made for experienced researchers, from both national and international sources, to be brought to SARIF to assist the young scientists in planning their programs, and in designing individual research projects.
3. Training of scientists should be a continuing process. The majority of the staff expected by 1988 will have received advanced degrees in Indonesian institutions. In continuing training for upgrading the staff, it is recommended that external institutions be utilized as much as possible. Training of technical staff in support of research is as important as training of research scientists. This could be accomplished mostly in-country. The laboratories in Bogor could provide this training at low cost. Provisions for financing this should be included in follow-on projects. The organization of training courses for equipment operators and maintenance personnel as well as for building and plant maintenance staff is urgently needed. Much of this could be done on-the-job.
4. SARIF organizational structure should be modified to add a position Director of Research. Research support should be placed under the Director of Research and should contain the analytical laboratory, the computer, statistical laboratory, experimental farms, and the research stations unit.
5. Urgent steps must be taken to complete the construction work on all six experimental fields by the end of 1986.
6. It is recommended that an expatriate assist in the maintenance and operation at the physical plant and its vehicles and equipment. Adequate operating funds must be provided.
7. In view of the cuts in the GOI development budget for 1986, and considering the inadequacy of operating funds. It is suggested that no additional development funds be spent for construction other than those already programmed and planned for the period ending in December 1986.

Lessons Learned:

Institutional development needs are dependent on various outside forces and can shift substantially over a seven year period (SAR Project spanned the 1978-1985 period). Donors as well as contractors must be sensitive to these unexpected changes and must be willing to adjust project resources accordingly. When the Project was designed, GOI funds were not considered to be a constraint; but in the 1985/86 agricultural budget reductions as high as 50% severely threaten the operation maintenance, and repair of physical infrastructure already in place. Reduced budget levels also threaten support services to returning Ph.D. and M.Sc. degree holders, who are expected to operationalize the programs outlined for SARIF's future growth and development. The assumptions, upon which successful project implementation is based, should be examined periodically. In this case budget cuts have only recently become a problem and both AID and GOI are responding by curtailing further construction and by focusing on a smaller number of research sites. This contraction has been necessary in order to fully develop a limited number of sites where trained staff and equipped facilities can be put to immediate use, rather than spreading these resources over a larger base with little likelihood of full utilization. Given the circumstances, GOI and AID have chosen to consolidate physical and human resources and emphasize more efficient management and administration of the research system, rather than to continue expansion.

ATTACHMENTS (List attachments submitted with this Evaluation Summary; always attach copy of full evaluation report, even if one was submitted earlier)

Terminal Evaluation of the Sumatra Agricultural Project (SARP)
dated January 27, 1986.

ATTACHMENTS

COMMENTS BY MISSION, AID/W OFFICE AND BORROWER/GRANTEE

Final Evaluation Report

Evaluation report was candid and presented useful insights into the best use of AID-financed resources during the remaining 11 months of the extended SAR Project. In addition it provided an excellent opportunity for SARIF to examine its own priorities and capabilities to achieve these priorities. The four person team (2 external expatriates and 2 Indonesians) consisted of high-ranking individuals representing a wealth of accumulated experience.

The team worked side by side with the SARIF Director and traveled to seven research sites with SARIF scientists. The evaluation process and results provides USAID/I with excellent guidelines and suggestions that can be incorporated into the seven year extended life of the Applied Agricultural Research Project (1981-1992).

MISSION COMMENTS ON FULL REPORT

XO-AMT-732-A 17
150-45839

**TERMINAL EVALUATION OF THE
SUMATRA AGRICULTURAL RESEARCH
PROJECT (SARP)**

USAID Grant No. 497 - 0263

USAID Loan No. 497 - T - 048

January 27, 1986

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ACKNOWLEDGEMENTS

The Team is grateful to the Director of SARIF, Dr. A. Syarifuddin K., who gave unstintedly of his time in explaining SARIF's structure and programs, and who accompanied the Team on its visits to the research stations and experimental farms. We appreciate especially the untiring work of Dr. Pierre Ph. Antoine in editing the early drafts of the report and in putting the material through the word processor, with the able assistance of Ms. Ernie Bustaman.

Francis J. LeBeau, Team Leader
Robert F. Chandler, Jr.
Sadikin Soeminta Wikarta
Didi Atmadilaga

January 27, 1986

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I. INTRODUCTION

The Sumatra Agricultural Research Project (SARP) was conceived for the purpose of developing a network of research stations and experimental farms in Sumatra. The network consists of a research center and experimental farms, some of which had been in existence for many years. Four of the stations were established during the life of the SAR Project.

In 1980, the Sukarami Research Institute for Food Crops (SARIF) was created with Sukarami as the principal center. Five of the research stations and experimental farms were grouped with the Sukarami center and experimental farms to form the SARIF network. Three of the stations/experimental farms originally included in the SAR project were or were in the process of being transferred to other research institutes of the AARD network. The SAR Project, however, continued to carry out the construction of buildings and development of other physical facilities on the latter stations, as originally provided in the grant and loan agreements. The institutional development element of SARP, however, is confined to SARIF.

The SAR Project consists of three principal elements:

(a) the construction of offices, laboratories, support buildings, facilities and housing at the institute center and the eight research stations and experimental farms, the development of land for experimental use at the farms and the provision of laboratory and farm equipment and vehicles;

(b) training of Indonesian personnel: thirty-four (subsequently increased to 72) long-term training scholarships for advanced degrees (Ph.D and M.Sc); short-term training for 10 individuals and travel grants to senior research and administrative staff to participate in international seminars and for observation visits to relevant research centers;

(c) technical assistance: 306 person-months of long-term assistance and 29 person-months of short-term consultancies.

The objectives of the project are to develop the network of facilities and research, administrative and support staff into a permanent institution for research on food crops in several different agro-climatic zones, and at the same time to contribute to ongoing research.

Financial support for the project is provided by a USAID grant of \$ 2.5 million for technical assistance provided in a grant agreement signed in September 1977 and a loan of \$ 7.0 million for the foreign exchange cost of training, for equipment and supplies and for some of the local costs for construction

and improvement of facilities at research stations (loan agreement dated April 1978). The Government of Indonesia is providing \$7.5 million local currency equivalent for facility development and improvement and research operations during the five-year life of the project.

The project is being implemented by CRIFC/SARIF with technical assistance by the International Agricultural Development Service (IADS), now a part of the Winrock International Institute for Agricultural Development.

The scope of the evaluation is broader than that initially proposed in that it includes an overall evaluation of SARIF as an institution as well as of the SAR Project itself.

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II. PRIOR EVALUATIONS

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An initial evaluation of the SAR Project was made in August 1979. At that date, little implementation activity had taken place, other than the continuation of ongoing research by the limited CRIFC staff and the initiation of training of personnel for advanced degrees in Indonesia as well as in foreign universities. None of the technical assistance personnel had arrived. The development of plans for facilities had barely begun.

A mid-term evaluation was made in January 1981. At that time it was noted that construction of facilities was substantially behind schedule and experimental farm development had not begun. Three of the long-term technical assistance personnel were at post and four short-term consultancies had been completed or were in process.

Three individuals had completed degree training and that for 19 others was in process. A number of short-term programs had been completed. Training in non-Indonesian institutions was being retarded because of the difficulty of finding suitable candidates with adequate proficiency in the English language. However, an English training program had been established which was expected to alleviate this difficulty.

Problems with respect to procedures for equipment procurement had surfaced. Efforts were being made to reach a decision on modalities for procurement. In the meantime, lists and specifications were being prepared for procurement. Other than vehicles, no procurement had been initiated against the foreign exchange allocated for that purpose.

The delays in project implementations were ascribed to: (1) a time lag of about 16 months between the signing of the grant agreement for technical assistance and the signing of a host country contract for providing this assistance, (2) a further time lag of nine months before the IADS chief of party arrived at post, (3) a time lag of about 15 months before a contract was signed for architectural and engineering services, (4) the lack of a master plan for site development, in part due to the lack of contour maps and soil surveys for each site, (5) the lack of a clear cut understanding of procedures, in particular those concerning USAID approval of detailed plans, specifications and cost estimates for construction and the modalities of off-shore procurement.

These administrative problems inevitably resulted in considerable delays in project implementation.

Notwithstanding the foregoing, the Team noted that some important research activities were under way and some notable contributions had already been made which were being applied by farmers. To a large extent, these were the result of continuation of research programs began under CRIFC before SARIF was officially established as a separate institute within the CRIFC group.

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III . EVALUATION METHODOLOGY

The Evaluation Team consisted of four individuals, two of whom were named by the AARD and two by USAID, as proposed by Winrock International.

As a first step, the terms of reference (TOR) for the evaluation were reviewed jointly with CRIFC and related institutions, AARD and USAID. As a result of this review, the original TOR, which focused principally on the SAR project itself, was broadened to include an appraisal of SARIF as a Research Institute and its potential for achieving a self-sustaining and self-developing institution from the administrative, management and technical points of view.

The Team examined principal SARIF and SAR documents relative to the SARIF mandate and relations with other research institutes: the SAR Project paper; grant and loan documents and contracts for technical services; SARIF quarterly and annual reports; consultants' reports and terminal reports of long-term specialists; prior evaluation documents; SARIF's forward program projections, etc.

The Team held discussions with the senior staff of SARIF at Sukarami, the Institute headquarters; inspected the state of the physical plant, of land development and of equipment at seven of the eight sites; discussed the state of ongoing research with headquarters personnel and the few personnel posted at the respective sites; visited related institutes/projects (an oil palm research station and a rubber research station near Medan, the TROPSOILS research project near Sitiung); visited and held discussions with farmers in established farming areas as well as in areas settled by transmigrants; met with Provincial Agricultural Service personnel (extension) in several locations and met with a "farmers' group" (farmers' groups constitute one of the key instruments in the technology transfer process). In the pursuit of these activities, the Team had occasion to travel in different parts of Sumatra, providing an opportunity to observe agricultural operations in several agro-ecological regions.

During the approximately three weeks of observation, the Team held frequent discussions among its members as well as with the Director of SARIF, the Winrock team leader, the station development specialist and with a representative of USAID. In these discussions, observations were analyzed, and tentative conclusions and recommendations were discussed. Through this process, consensus was reached on most of the observations, conclusions and recommendations, as recorded in this report.

Debriefing, during which the principal conclusions and recommendations were discussed, were held with AARD and USAID before the report was finished.

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IV. INSTITUTIONAL EVALUATION OF SARIF

A. Organizational Structure of SARIF

SARIF is one of many specialized agricultural research institutes under the Agency for Agricultural Research and Development (AARD) in Indonesia. The chain of command is from the Director General of AARD to the Director of the Central Research Institute for Food Crops (CRIFC) in Bogor, to the Director of SARIF. Since 1984, the Director of SARIF is directly accountable to the Director of AARD.

The organization within SARIF has not been fully determined. However, the activities under the Director of SARIF can be grouped as follows: (1) administration, which includes personnel management, financial offices, and general services (inventory, security and housing); (2) plant Services, which included the analytical laboratory, workshops, the motor pool and the experimental farm; (3) research stations (the 5 experiment stations outside of Sukarami); (4) the scientific departments, which include plant breeding, agronomy, plant physiology, post-harvest technology and agricultural economics; and (5) information and communications, which includes, (a) editing and publishing research findings and (b) the library services.

The Team recommends that the organization be strengthened by adding to the staff a director of research, with a title in compliance with Indonesian policy. The current Director of SARIF is an intelligent and capable person but his many duties make it difficult for him to give the detailed attention to the research program that it deserves.

If a director of research is provided, the Team recommends that he be given the power to administer the day-to-day research activities at Sukarami as well as those taking place at the outlying experiment stations.

The Team believes that several changes in the organizational structure of SARIF would improve the smoothness and efficiency of its operation. The suggested changes are reflected in the organization chart shown in Figure 1.

There are other ways of organizing an institute and the proposal in Figure 1 is simply one that has seemed to work well in several other research institutes.

The Team noted that SARIF designates some research sites as "sub-stations" and others as "experimental farms". Although it is recognized that the stations vary in size, the Team sees no reason for their not being placed in the same category via experiment stations. AARD, conscious of the tendency of the

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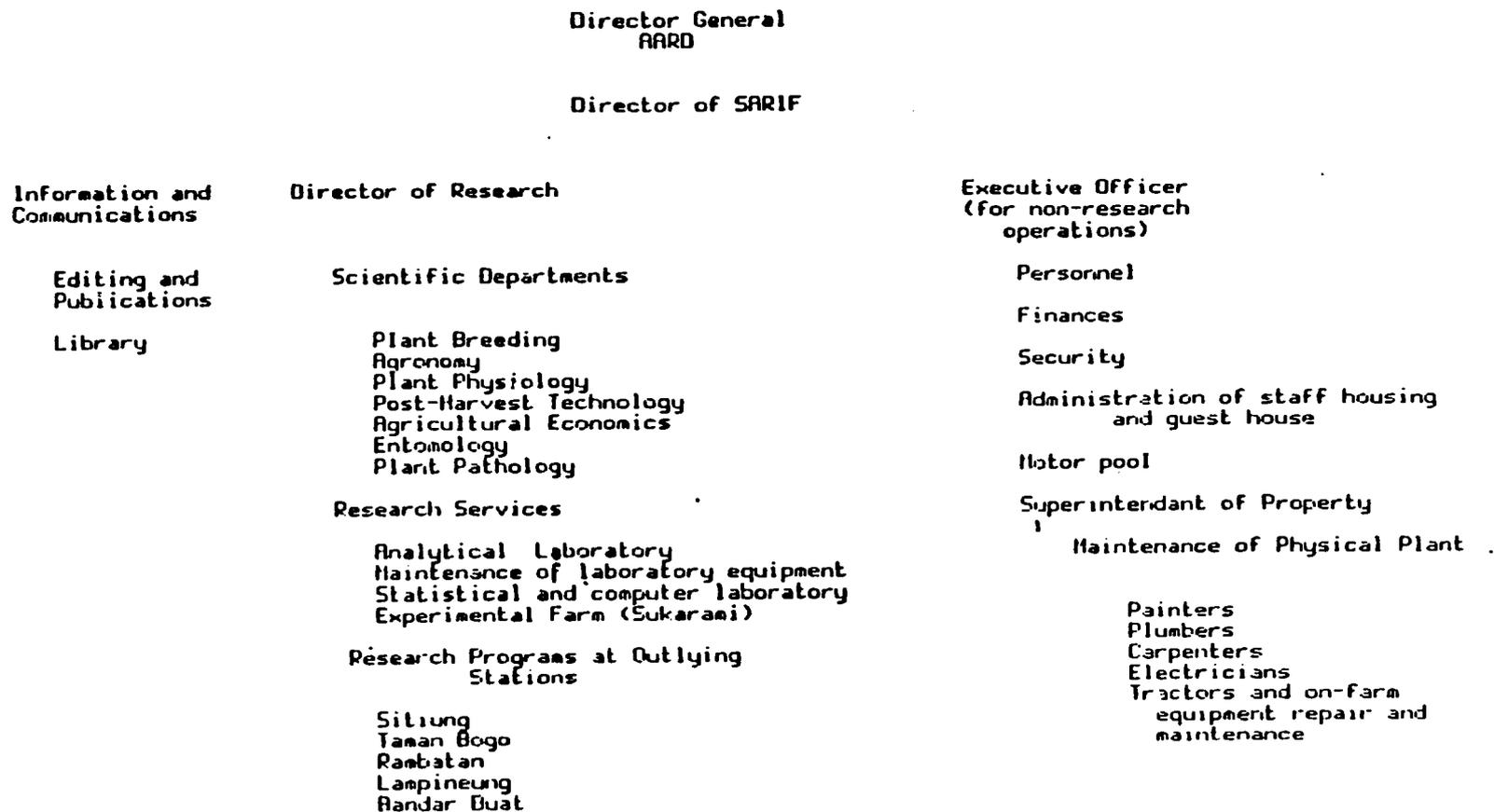
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Figure 1. A suggested Organizational Chart for SARIF.



research institutions to expand the number of experimental farms, has adopted a policy, not only of limiting this practice, but also of urging the elimination of some experimental farms and relying on provincial agricultural services for verification, trials and field testing of results from research stations.

SARIF has had a few foreign staff who have been in residence for extended periods. They have served principally as advisors. The Team believes that the effectiveness of the specialists from abroad would be enhanced considerably if these persons were considered as co-workers and, when no qualified person can be found, the specialist serve as a temporary staff member with full responsibility for a given activity. The effective use of expatriates from several organizations as direct participants in the research activities rather than as advisers during the 1970-1980 buildup of the country's agricultural research institutions bears witness to the effectiveness of this approach. SARIF is urged to adopt such a practice.

A good example of this is the farm development specialist presently assigned to SARIF on behalf of Winrock International. There is no one at SARIF who has had sufficient training and experience to develop the research stations and to set up a system of plant maintenance. If the farm development specialist could be named as head of station development and maintenance of the physical plant until he has had time to train and develop Indonesians to handle those responsibilities, it would greatly speed up the development of SARIF. This should be clearly specified in a redefined TOR for this long-term position. At present, this part of SARIF's operation is in bad shape simply because no one is qualified to take responsibility for it.

SARIF has a routine budget (salaries, and regular operating funds) and a development budget (expansion of staff and program). Much of the future program of SARIF will depend for its support from development funds. The Government of Indonesia has just announced that severe cuts in the development funds for 1986 have to be made.

The Team is highly concerned that the money allocated for operational costs of the six experiment stations under SARIF will be inadequate to conduct an effective research program.

The Team noted that the most frequent reason given for a lack of, or delay in, achieving some objectives was insufficiency of money, and this was before any cut in funds. A cardinal principle of the development of national research programs is that no more stations be developed than can be properly supported. It is better to have three first-class research stations than six mediocre ones.

The Team gathered the impression that there is more than adequate budgetary control at SARIF. Some people interviewed feel that local purchasing procedures should be simplified.

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From brief observations it is possible that the organization of the research program could be improved. Young people just returning from graduate study need reorientation and guidance, especially during the first year. Furthermore, someone must clearly see the overall program of SARIF and be certain that all research projects contribute to the main objectives. This, of course, would be a major responsibility of the functional director of research.

A final comment under "organization" is the availability of staff. It seemed to the Team that there was little assurance that the senior scientific staff would move to Sukarami and live in the houses. The same applies even more to the outlying experiment stations. The most efficient research operation will result from having the research staff and their families live at the experiment stations where they work. Good housing has been provided with the assumption that it will be used. The Team feels that this should be a requirement for being posted at SARIF.

B. The Mandate of SARIF

The Team found that there was some confusion about the precise mandate of SARIF. For example, in the publication by Syarifuddin and Rachie on SARIF's Long-Range Program, it is stated that "SARIF has a broad mandate for improving upland (annual) crops of the humid tropics, including the most important crops of the region (corn, cassava, soybean and peanuts)".

The Team observed that working with the genetic improvement of crops, other than upland and high-elevation rice, was in conflict with the mandate of other institutes, especially the Malang Agricultural Research Institute for Food Crops (MARIF) in East Java, which has the mandate for the improvement of palawija crops.

In view of the above, the Team recommends that the mandate of SARIF should be as follows:

- (1) research with upland rice;
- (2) research with high-elevation wetland rice;
- (3) farming systems research, especially in the regions where upland rice and high-elevation rice are grown. The wheat research program (which was assigned to SARIF by AARD in 1985) will be included in the high-elevation farming systems program.

Within this mandate, SARIF could not work with the genetic improvement of any crops except upland and high-elevation rice. The work with all other crops would involve only the testing and selection of varieties from other sources, both national and

international and with their management (cultural practices, fertilizer requirements, insect and disease control, etc).

To make this mandate official, it may be necessary to slightly modify the MOA 1984 decree (Part IV, article 58).

Although SARIF's mandate is national in scope, it is suggested that, for the next five years at least, SARIF should limit its activities to Sumatra. This is desirable, if not imperative, because of the operational budget outlook for the next several years and the time required for the organization of the research program by the staff returning from training.

C. SARIF's Long-Term Strategy and Program Planning

Staffing. In its future planning for a research staff, SARIF expects to have on its staff 16 Ph.D's and about 50 with M.Sc degrees by the end of Pelita IV (1989).

SARIF's Field Stations. The present plans call for SARIF to develop and operate at full capacity the following field stations:

1. Sukarami (West Sumatra) will serve as headquarters, as the center for major research services, and will conduct research on high-elevation irrigated rice;
2. Sitiung (West Sumatra) will carry out research on upland rice and on associated farming systems in a wet climate and at low elevations;
3. Rambatan (West Sumatra) will work with upland rice and farming systems under conditions of intermediate rainfall (1800 mm) and elevation (600 m);
4. Taman Bogo (Lampung) will work with upland rice and farming systems at low elevations and wet climates (2500 mm or higher);
5. Lampineung (Aceh) will conduct research on rainfed-bunded rice and on farming systems in an area with a 6-month dry period, but with an annual rainfall of about 2000 mm;
6. Bandar Buat (West Sumatra) will work with seed production and rice breeding.

Plant Breeding. SARIF will not attempt to conduct breeding programs for any crops other than upland and high-elevation rice. It will collect and evaluate germplasm from national and international sources and make crop selections for use in farming systems suitable for the low-pH, high-Al soils that occur in Sumatra and in other parts of Indonesia. It will include wheat in its farming systems research program at high elevations.

Cultural Practices SARIF will develop fertilizer and soil amendment application practices appropriate for the varying soil conditions in its mandate agroclimatic areas, especially for the low-pH/high-Al soils. It will also study time of sowing, weed control and integrated pest management not only for upland and high-elevation rice but for any crop, including wheat, used in the farming systems research programs.

Agro-Economic Studies. As new technologies are developed, it is essential that studies of economic feasibility be conducted. SARIF will determine cost/benefit ratios for such practices as liming and fertilizer application, plant protection, and the various combination of crops included in farming systems research. Furthermore, it will study the income and employment consequences as well as the marketability of the crops used in the farming systems.

Post-Harvest Technology. As the SARIF program develops, it will not only include studies to reduce post-harvest losses in rice, but in other food crops included in the different farming systems that will be designed during the coming years.

Modification of the Program in the Long Run. SARIF has done some planning for the more distant future and the Team has given the matter considerable thought. SARIF's ideas have been set forth in a publication by A. Syarifuddin K. and K.O. Rachie entitled, "The SARIF Long-Range Program in the 1990's," which was published in mid-1985. A few of SARIF's and the Team's thoughts on the long-range research program of SARIF are given in the following paragraphs.

It is not expected that SARIF will undertake, even in the distant future, plant breeding work with any crops except rice. Naturally, it will test the most promising varieties of any crops that are included in SARIF's farming systems research program. These varieties, however, will come from various national and international research institutes that have the mandate for improving such crops.

Likewise, SARIF will not undertake fundamental studies in soils, but will investigate practical means for counteracting the ill-effects of high soil acidity and aluminum toxicity in the red-yellow podzolic soils.

The farming systems program at present appears to be restricted largely to upland or high-elevation rice plus one or more of the following crops: maize, soybeans, peanuts, mungbeans, cassava and sweet potatoes. Sometimes, intercropping of maize and upland rice is practiced and wheat is being tried on a limited scale at high elevations during the dry season. Also, chile peppers are grown as a cash crop, as well as for home consumption. Thus, it is a cropping systems research program growing those crops (with the exception of wheat) that are known to grow well in the wet environment of much of Sumatra, under appropriate soil management practices.

In the long run, it is suggested that SARIF expand its farming systems program to include not only palawija crops but also horticultural crops, trees, alley cropping studies, fish culture and animals (especially goats and chickens).

The Team visited the Sitiung Transmigration Areas, talked with extension workers and farmers, as well as with the people engaged in the TROPSOILS program. It is the Team's opinion that as SARIF's program matures, it will place less emphasis on upland rice, and more on other crops. The areas where upland rice is now being grown are subject to severe erosion and unless such practices as terracing, or tree planting on the contour, are introduced, soil productivity will certainly decline. Simply sowing rice on the undulating to steep slopes in the Transmigration Areas of West Sumatra is highly conducive to soil erosion.

Looking at the national scene, the Team was told that about 14 percent of the rice area of Indonesia is devoted to upland rice culture, yet it constitutes only 5 percent of national rice production. Yields of upland rice, soybeans and peanuts are about the same (1.7 t/ha), but the market value of soybeans and peanuts is two to three times higher than that of rice.

While on the national scene upland rice may not be very important, for the approximately one million farmers who produce upland rice on about 1.2 million hectares upland rice is important. Yet, as more profitable farming systems are developed it is likely that these farmers will shift their production to the more profitable systems.

The Team supports SARIF's plans to enlarge the scope of its farming systems research program to include work with woody perennials (both agroforestry practices and the use of fruit trees), integrated plant/animal systems and aquaculture. The abundant water resources of West Sumatra are especially conducive to expanding the production of fresh water fish, which would add to the incomes as well as the nutrition of the rural population. By conducting a complete farming systems research program, SARIF will be able to contribute significantly to the establishment of small family farms that satisfy the needs for increased cash income as well as subsistence requirements of food, fuel and animal feeds.

D. Accomplishments within the mandate

In spite of SARIF's problems and its early stage of development, a number of important results of its research program are already being used by farmers. A few of the more significant advances are presented briefly in the following paragraphs:

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1. Cold-tolerant rice. Two new cold-tolerant rice varieties, Batang Agam and Batang Ombilin, have been tested, multiplied, and widely distributed in Sumatra for planting at elevations ranging between 800 and 1,400 meters. Since these varieties were released in 1982 and 1984, further trials indicate that newer varieties may soon be available that produce even higher yields.

2. SARIF has assigned a cadre of researchers to Aceh to assist in increasing the yield and production of soybeans, a highly important crop in that area as a second crop following rice. They have demonstrated to farmers the advantages of planting soybeans in the rice stubble immediately after harvest, with zero tillage. Furthermore, they have shown the advantages of seed inoculation, proper plant population, and the use of insecticides for the control of bean fly and podborers.

3. SARIF scientists have demonstrated that, at higher elevations, improved varieties of maize such as New Harspan, when properly fertilized, will produce consistently more than 3 t/ha of grain.

4. SARIF researchers have helped develop improved multiple cropping systems with combinations and/or successive plantings of upland rice, maize, cassava and legumes to provide nearly year-round soil coverage and a steady source of food for home consumption or for marketing. An improved variety of upland rice is expected to be released in the near future.

5. SARIF has clearly shown that applying 2 to 3 t/ha of lime to acid latosols and red-yellow podzolic soils has increased upland rice yields by 40 percent, maize and peanuts yields by 100 percent, and soybean yields by 300 percent.

6. SARIF initiated research on peat soils in the Kabupaten Pesisir Selatan area in 1982. A few of the more important results are summarized below:

In a trial of 53 rice varieties on shallow peat, 5 varieties produced between 4.5 and 5.2 t/ha.

On deeper peats, rice yields were not as high, but sweet potato yields of the better varieties ranged between 30 and 60 t/ha.

The highest yields of rice on deep peat soils were obtained with zero tillage.

7. Studies on the seedling fly of rice at the Sitiung research station showed that the application of Curator 30 (0.6 kg/ha of active ingredient) gave good control.

8. SARIF is experimenting with varieties, planting dates and soil management methods with wheat with the objective of obtaining profitable yields during the dry season at high elevations. Although it is too early to predict the future of wheat growing in Indonesia, some preliminary results are promising, and the



research program will be intensified during the years ahead.

9. Considerable research is taking place at Sukarami, Sitiung and Rambatan with varietal testing and fertilizer applications, including ratios of potassium and silica, and of lime and phosphorus, as well as studies of insect and disease control of rice and other crops being grown in farming systems.

E. Capacity for self-development, self-evaluation and program adjustment.

It is the opinion of the evaluation team that SARIF has a way to go before it can operate successfully without outside help. A large share of the research staff who have returned from long-term graduate study with either a Ph.D or an M.Sc degree (numbering about 30) have only recently returned. Furthermore, about 40 SARIF researchers are still undergoing graduate study abroad or at Indonesian universities. It will require one to three years for this rather young staff to plan and carry out substantial research projects. Furthermore, although excellent progress has been made in constructing buildings for research and residences for scientific staff and their families, the experimental fields are yet to be fully developed. There are severe shortages of trained and experienced support staff to maintain the physical plant and equipment and to manage the experimental farms. Actions needed to overcome such constraints are included among the recommendations of this report.

It is the opinion of the Team that SARIF will need the advice of more mature scientists from both Indonesian and foreign institutions for the next 5 to 7 years before its staff is experienced enough to handle its own operations of development, evaluation and program adjustment.

F. Relations with other Institutions*

1. AARD. Obviously, there is a close relationship between AARD and SARIF because SARIF is within the AARD system. It depends on it for financial support and for official policy decisions.

2. CRIFC. There is an even closer connection between CRIFC in Bogor and SARIF. Its research program must receive the approval of CRIFC. Furthermore, this institute provides experienced consultants from its own ranks who visit SARIF for short periods to help develop research programs and projects, and to assist the young scientists in interpreting the results of their research.

* A rather complete list of institutions and organizations with which SARIF has some contacts is given in Appendix II.

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3. Other research institutes dealing with soil, livestock and perennial crops.

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There are intense soil problems on Sumatra and the Center for Soil Research in Bogor can make a significant contribution to SARIF's program by helping to identify soil problems and ways of alleviating them.

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The TROPISOILS program which is administered by the University of Hawaii in cooperation with the North Carolina State University, with financial support from USAID, has a joint program with the Center for Soil Research in the Sitiung Transmigration Area. Several expatriate scientists are posted there and are engaged in developing soil and crop management systems for that area. The staff of SARIF and of TROPISOILS confer frequently and plan to integrate their research programs in the near future.

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The animal scientists can advise SARIF regarding the animal component of its farming systems research program as it develops in future years.

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The institutes working with perennial crops, such as coffee, rubber, oil palm and forestry, can contribute significantly in the selection of woody species for inclusion in the farming systems program - an element that is highly important in erosion control on the undulating and hilly lands in many Transmigration Areas.

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SARIF maintains collaborative relations with several of the International Agricultural Research Centers (IARCs): The International Rice Research Institute (IRRI), The International Institute of Tropical Agriculture (IITA), The International Corn and Wheat Center (CIMMYT), The International Crops Research for the Semi-Arid Tropics (ICRISAT), The International Potato Center (CIP), The Asian Vegetable Research and Development Center (AVRDC); The International Center for Tropical Agriculture (CIAT) and The International Service for National Agricultural Research (ISNAR). These relationships include exchanges of genetic materials and varieties, participation in collaborative programs of testing varieties and genetic materials, exchanges of publications, participation of SARIF personnel in training programs organized by the respective centers and participation of SARIF staff in problem-oriented workshops and meetings.

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4. Universities. Because of the relative lack of experience of many SARIF researchers, the universities can (and are) contributing greatly to the training of SARIF younger researchers. Furthermore, they send senior staff to SARIF to assist the young researchers in setting up their programs and projects.

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The larger universities now cooperating with SARIF in training and research are Andalas University in Padang, IPB in Bogor, Gajah Mada in Yogyakarta and Padjadjaran University in

Bandung. There is some cooperation with several smaller colleges or universities on Sumatra.

5. Transmigration Program. SARIF is cooperating extensively with the Transmigration program on Sumatra. The Sitiung research station is located in the heart of a large Transmigration Area. In addition, SARIF scientists are conducting many experiments with upland rice and associated crops on transmigration farms, in close cooperation with farmers and extension workers.

6. Extension and farmers' organizations. The Team had a few opportunities to listen to extension workers and farmers groups, especially in West Sumatra and Aceh. The Team was favorably impressed with the speed with which new rice varieties were multiplied and distributed. Furthermore, farmers were aware of new developments and were anxious to get and use new information when it became available. Farmers' cooperatives and private dealers seemed to have on hand adequate supplies of fertilizers and agricultural chemicals.

7. Other agricultural enterprises

Commercial concerns, such as Ciba/Geigy, Shell, ICI, Pusri, Pillsbury and Petro Kimia, are supporting limited research at SARIF. Most of the grants are relatively small (often the equivalent of U.S. \$ 2,000) but they are helpful in providing the costs of conducting field experiments with agricultural chemicals, such as insecticides, fungicides and fertilizers.

8. Connection with broader agricultural strategy for the regions concerned. There is a close relationship between the agricultural policies and strategy of the provinces where SARIF's institutes and farms are located. The staff confers with the provincial agricultural offices. The Team visited with the Governor of West Sumatra at his request and found him to have a keen interest in SARIF. He offered to use his influence in maintaining appropriate financial support for the Institute. As far as the Team could determine, the research program of SARIF is closely related to the broad strategy developed in the provinces. The farming systems mandate provides an opportunity for experimenting with highly diversified production systems which could result in better utilization of agricultural resources, in increasing farm income and in improving living standards of the rural population.

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V. THE SAR PROJECT (AARD/WINROCK/USAID) PROJECT
#487-0263 AND LOAN #487-T-048

A. General

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Within the broad goal of increasing agricultural production and increasing rural employment and income, the purpose of the SAR Project is to "expand and improve agricultural research on food crops to address agro-climatic factors peculiar to Sumatra". A commitment of 9.5 million dollars - 2.5 million dollars of grant funds and 7.0 million dollars of loan funds - was made by USAID to match 7.5 million dollars equivalent of local currency by the Government of Indonesia. A five-year implementation period was projected to end in April 1984.

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The project involved four principal elements: (1) the development of physical facilities - construction and furnishing of buildings, installation of utilities, development of roads and other services in building compounds, and development of farms for research purposes - at the institute headquarters and at eight additional locations; (2) equipping laboratories and farms; (3) training of research staff and (4) provision of technical assistance in several aspects of institutional development including physical plant and farm development, manpower development, programming, design and implementation of research activities, and administration and management of facilities and services.

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Earlier evaluations - 8/79 and 1/81 - noted that project implementation was substantially behind schedule (see section III). This was true with respect to each of the elements. A thorough review of project implementation, including analysis of the impact of certain unforeseen developments in project strategies through the end of 1983, resulted in a recommendation for certain changes in inputs and the extension of the project completion date to April 1986. These recommendations were authorized in April 1984. Moreover, it was subsequently recognized that certain of the project objectives - farm and land development in particular - would not be achieved by April 1986. Therefore, a further extension of the terminal date for SARP through December 1986 was being negotiated while this evaluation was in progress. This extension would avoid a gap between the termination of SARP in April 1986 and the beginning (January 1987) of the implementation of an extension of a broader research project supported by USAID (Applied Agricultural Research # 647-0302) which will include continuing assistance to SARIF.

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As of December 1985, six staff members had returned from Ph.D studies, five financed by USAID and one by the GOI, and 26 had completed training for the M.Sc degree, of which nine were supported by USAID. Continuing long-term study include training at overseas institutions of six Ph.D candidates and two M.Sc candidates. Thirty staff members were continuing studies in Indonesian institutions, of which six were candidates for the Ph.D degree and 26 for the M.Sc.

A total of 49 individuals have received short-term training overseas and 184 in-country. Short-term travel grants were provided for 12 senior individuals directly or indirectly concerned with the project.

4. Technical Assistance

The originally programmed 252 person-months (PM) of long-term specialists and 24 PM of short-term consultants were modified by the agreement of April 1984 to increase expatriate specialists' participation to 306 and 29 PM, respectively. After a slow start, IADS was able to field the full complement of long-term specialists by mid-1982.

Through December 1985, approximately 18 PM of short-term technical assistance involving 14 subject matter/task areas had been provided.

C. Evaluation

1. General

The delays experienced in each of the activities of the project is in large measure due to unrealistic projection of activities over time, which is not unique to this project, but is generally true of AID projects. Nevertheless, more expeditious implementation could have been expected.

Some of the reasons for slow implementation are: an apparent lack of understanding by the project leadership of regulations imposed by USAID and the GOI; changing regulations as implementation proceeded exacerbated this problem; communication difficulties between Bogor/Jakarta and SARIF; the shifting of responsibility from CRIFC to SARIF approximately 18 months after the project was authorized; the lengthy and complicated process for transfer of funds from CRIFC to SARIF, and from IADS to the IADS team leader; changes in the mandate of SARIF and in the designation of research stations and farms which make up the SARIF network; underestimation of the elements involved in research farm development; lack of understanding of AID regulations with respect to approval of engineering designs, specifications and cost estimates; restriction on use of GOI funds for use of force account for construction and land development; and the limited English language proficiency of staff members.

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In spite of delays and numerous problems which had to be overcome, project implementation has moved forward satisfactorily in most areas. The SARIF staff and IADS/Winrock can be justly proud of accomplishments toward the establishment of a complex agricultural research institution.

2. Development of physical facilities

The two-year extension of the Project to April 1986 compensated for the time lag in getting implementation of this activity started. With the exception of the office and laboratory building at Kayu Agung, all buildings construction should be completed by April 1986. Design and construction appear to be of acceptable quality. It appears that, for certain sites, there may be some overconstruction, especially for the short term. Given the limitation on operational budgets which has developed since the project began, a time-phased development of the several stations might have been preferable to a simultaneous development of all sites.

The most serious deficiency in this activity is in the area of farm and land development. Attention to this sub-activity was delayed presumably to favor the building program. However, failure to carry out this sub-activity concurrently with other elements of research station/farm development will seriously interfere with field research for the next several years.

Some of the reasons why this sub-activity has lagged so seriously are: the underestimation of the complexities involved in this work and the lack of understanding of the job by the architect/engineering firm selected. It was perhaps optimistic on the part of SARIF leadership to believe that the architectural firm retained could do the design and estimate work quantities. After the conclusion was reached that the most effective way to do the farm and land development was through use of force account and equipment under the supervision of the Winrock research farm development specialist, the problem of transfer of funds allocated for contracting purposes to use for force account and procurement/rent of equipment had to be faced. These problems are reported to have been recently resolved. However, concrete activity towards accomplishment of this sub-activity has yet to be initiated. Unless work is started immediately the likelihood of completing the task by December 31, 1986 is rather remote.

3. Procurement of Equipment

The procurement of equipment is keeping pace with other aspects of station development. Because most of the farm and laboratory equipment has not yet been distributed to the experiment stations, it was difficult for the Team to evaluate this part of the project. However, the Team did observe that there were several kinds of equipment which appeared to be inappropriate for the sort of work that is being, or will be,

undertaken. Two examples are given below:

(1) twenty units of a two-wheeled, walking tractor were purchased but have proved to be unsuitable for use. Unless modified at a cost of not less than U.S. \$ 500 each, they cannot be operated either usefully or safely, and even then they will have only limited application;

(2) several high-capacity seed cleaners were purchased, but haven't even been uncrated because they were designed for cleaning large lots of seed, such as would be produced on a seed multiplication farm. Apparently whoever was responsible for purchasing these did not realize that work on experimental fields involves small plots which are widely scattered at any one time, and small threshers and seed cleaners are the only appropriate size to use.

4. Training

Training of research workers for advanced degrees has proceeded at a pace in keeping with projected manpower requirements. Difficulties in finding candidates with adequate English language proficiency has reduced the number of staff who could be trained in external institutions. The training of a reasonable number of individuals in external institutions provides a diversification which is important to the development of a well-rounded research staff. Although some progress has been made in providing opportunities for improving English language proficiencies, a greater effort is needed toward assuring that increasing numbers of candidates for advanced degrees, especially at the Ph.D level, can be recruited for training at non-Indonesian institutions.

Training programs to date have focused almost entirely on the scientific staff. There is a critical need for trained personnel in administration, management, and in mechanical skills. The training of personnel in plant maintenance and operation, equipment maintenance and operations, and in administrative and management procedures is urgently needed.

5. Technical Assistance

After a slow start in recruitment, IADS/Winrock has been able to maintain a full complement of long-term specialists on board since mid-1982. Short-term consultancies have been provided consistent with the development of facilities, the staff and the research programs. Approximately 2/3 of the long-term technical assistance provided focused on facilities development, administration, research planning and management. The remaining portion was more directly related to specific research activities. Of the 14 consultancies involving approximately 18 PM, 10 involving 12 PM were concerned principally with different aspects of institution development.

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The technical assistance program made definite contributions to both the short-term and long-term development of SARIF as an institution and to immediate short-term research objectives.

Among the contributions of the long-term technical assistance are: participation in the planning and oversight of the buildings and facilities development program, as well as in providing orientation to the research program; establishment of administration and financial management procedures; participation in defining field and laboratory equipment requirements and in procurement; development of training programs; preparation, in collaboration with the Director of SARIF, of a long-range research program for SARIF; and specific research contributions in agricultural economics and in soil management. A particularly important contribution was the preparation of a two-volume study on the geography and ecology of the different agro-climatological zones of Sumatra with a description of the principal characteristics of the agricultural systems of each zone.

Notable accomplishments of the short-term consultancies are: the development of a manpower development plan; research logistic support; training of staff in experimental design; communication and information services; laboratory equipment requirements, installation and analytical procedures, small machinery for use at SARIF and definition of an approach to Farming Systems research.

6. Personnel

The existing research staff consists largely of young recent graduates - most of the staff completed advanced degree training since 1981. Although this young group of scientists may be well trained academically, their experience in carrying out research is very limited. Moreover, the staff will be approximately doubled within the next 2 years by addition of recent graduates who will be equally inexperienced. To be effective, they need guidance in programming, project definition, experimental design, data analysis and interpretation. This can only be provided by more mature research scientists. Some guidance is being provided from CRIFC and from universities. This does not furnish day-to-day assistance, however. A mature senior director of research heading up the research division of SARIF would greatly improve this situation.

The support staff is also very youthful and could profit from guidance from more experienced personnel.

A problem resulting from the limited number of experienced personnel on the staff is that of maintaining administrative authority and research leadership during the frequent absence of the institute's director. Each major division of the SARIF organization should be headed by competent and experienced individuals who could assume the responsibilities of acting director when the need arises.

7. Achievement of EOPS

The project paper projected that 4 conditions would exist at the end of the project: (a) physical facilities in place; (b) professional staff trained; (c) sufficient technical staff trained and hired and (d) research performed during the implementation period.

Most of the conditions will be satisfied by the end of the project, assuming that the proposed extension through December 31, 1986 is approved. There will nevertheless be a continuing need to upgrade personnel as suggested in sections 4 and 6 above. Continuation of technical assistance in critical areas, as specified in the body of the report, will also be needed.

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VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1 The purpose of the SAR Project is "to expand and improve agricultural research on food crops to address agro-climatic factors peculiar to Sumatra". As project implementation moved forward, the Sukarami Agricultural Institute for Food Crops (SARIF) was created. Six of the stations, including the headquarters station at Sukarami, were absorbed into SARIF. The SAR Project then assumed a dual purpose: the completion of physical facilities at the original nine sites and the strengthening of SARIF as an institution.

2. In spite of initial delays which necessitated extension of the project terminal date, implementation momentum increased as the several activities became organized and numerous problems and impediments were overcome. The original SAR Project activities were completed or were near completion, except for the development of farms for experimental use. This was still lagging and was faced with a number of administrative and procedural problems.

3. There seems to be some confusion as to the precise mandate of SARIF. In order to avoid conflicting or overlapping with the mandates of other established institutions within AARD, the Team studied this matter and recommends the following mandate for SARIF: (1) upland rice, (2) high-elevation rice, and (3) farming systems for the humid tropics, largely in the environments where upland rice and high-elevation rice are now being grown.

Another aspect of mandate is that of geographical coverage. Although it is recognized that SARIF's mandate is national in scope, its research programs should be restricted to its current geographic coverage for the next five years. Placing its programs on a solid organizational and operational basis should be the primary objective during this early period.

SARIF would undertake plant breeding only with rice; the varieties of other crops included in the farming systems research program would be those developed at other institutions, both national and international. Because of the interest in increasing wheat production in Indonesia, this crop will become an important ingredient in the farming systems program involving high-elevation rice.

4. Because most of the scientists of SARIF have only recently returned from advanced study toward the M.Sc or Ph.D degrees, it is recommended that arrangements be made for experienced researchers, from both national and international sources, to be brought to SARIF to assist the young scientists in planning their programs and in designing individual research projects. Some of these mature individuals should be at SARIF for extended periods, while others may serve as short-term consultants.

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5. In the same vein as the above recommendation, the Team sees a definite need for the creation of the functional position of Director of Research, with a title compatible with the Indonesian system. Such a person should be mature (but not ~~overmature~~) and fully experienced in crop or soil research. It is important that the person selected not only be a good scientist but possess qualities of leadership and be able to maintain a good esprit de corps among the staff - an element that is essential for maximum output.

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The Team wishes to stress the point that this position should carry the responsibilities of a Director of Research, not those of a Research Coordinator. In other words, he should have full authority to control the research programs, although, of course, he would be accountable to the Director of SARIF.

The Team recommends that this position be included within the Technical Assistance item being provided to SARIF under the extension of Project No. 647-0302, to begin in January 1987.

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6. Training of scientists for advanced degrees is progressing as rapidly as qualified candidates become available. The existing staff, when augmented by some 40 individuals who will receive advanced degrees within the next two years, will provide, with few exceptions, a well-rounded staff. A special effort will be required to develop additional personnel in the fields of agricultural economics and plant pathology.

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Training of scientists should be a continuing process. The majority of the staff expected by 1988 will have received advanced degrees in Indonesian institutions. In continuing training for upgrading the staff, it would be desirable to utilize external institutions as much as possible. This would provide diversification in orientation, philosophy and approaches which would contribute significantly to building a well-rounded staff.

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Training of technical staff in support of research is equally important to that of research scientists. This could be accomplished mostly in-country. The laboratories in Bogor could provide this training at low cost. Provisions for financing this should be included in follow-on projects.

Weakness in the general support unit - see section 7 - is in part due to the limited training which is being provided for this personnel. The organization of training courses for equipment operators and maintenance personnel as well as for building and plant maintenance staff is urgently needed. Much of this could be done on-the-job.

7. The Team suggests that the organizational structure be somewhat modified. A suggested organization chart is in the body of this report. The main changes are: (1) research support is placed under the Director of Research. This unit would contain the analytical laboratory, the computer and statistical laboratory, and the experimental farms, and (2) the unit now called "research stations" (the outlying experiment stations) would also be placed under the functional position of the Director of Research.

8. The Team is concerned about the time and expense involved in travelling from the headquarters at Sukarami to the various experiment stations. It is recommended that every effort be made to post as many as possible of the research scientists at the outlying stations.

With some of the more remote stations, it may be necessary to assign researchers there who have no schooling problems, or to give extra pay, or fringe benefits, for working at a hardship post.

9. One of the weakest elements in SARIF is the so-called "general services" unit which maintains the buildings and grounds, including machinery and equipment. The Team recommends that an expatriate (this could be the incumbent advisor) who is fully experienced in this area be appointed as a temporary staff member in charge of maintaining and operating the physical plant and its vehicles and equipment. He would continue in this position until his counterpart has been trained and has demonstrated his ability to assume the responsibilities of the assignment.

10. Construction and development of physical facilities which are completed and/or scheduled for completion shortly are well conceived and should be adequate for 5-10 years.

The Team understands that there is a proposal for establishing an international research and training center for upland rice at Sitiung. Although it recognizes the important role that such a center could play, it is of the view that the establishment of such a center in the very near future would severely strain the administrative and management capabilities of SARIF while it is in the process of consolidating its network of stations and programs.

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The Team is concerned about the fact that most of the experimental fields of the experiment stations of SARIF have not been prepared for use. Roads, drainage ditches and leveling remain to be done. All experimental fields are small as compared with the size of the planned research staff as well as the physical plant that has already been built on most of the stations. Urgent steps must be taken to complete the construction work on all six experimental fields by the end of 1986.

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The Team could not adequately appraise the adequacy of the equipment which was on hand or on order because much of that on hand was not unpacked and distributed. It was noted, however, that certain equipment was not suitable for the intended use. Certain additional equipment items will undoubtedly be needed to adequately round out the equipment package.

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11. The document entitled "The SARIF Long-Range Program into the 1990's", by Dr. A. Syarifuddin K. and Dr. K.O. Rachie, provides an excellent overview of SARIF's planned research program for both the short and long term.

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The Team observed that the current research activity is not yet fully developed. This is partially due to the fact that over half of the research scientists have not yet returned from graduate study. Also, it seemed to the Team that an inordinate number of the principal resident scientists were absent from Sukarami, attending workshops, conferences and the like. Such activities are helpful, of course, but it can be overdone.

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The Team suggests that, during the next year or two, SARIF make a major effort to "get its act together". The orientation of staff returning from abroad, the planning of programs and projects, the completion of the shaping of experimental fields, and conducting experiments on farmers' fields within the scope of the current program, may be all that can be expected.

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In the long run, however, the Team strongly supports SARIF's plan to expand the scope of its farming systems research, especially to assist the Transmigration families who are contending with problems of soil acidity, aluminum toxicity and severe soil erosion. Farming Systems must be designed that will provide the farm family with much larger cash incomes, with better nutrition, with fuel wood, and animal feed. The expanded program should include animals for draft purposes as well as for food (goats and chickens), and aquaculture should not be neglected. Furthermore, wheat should be included in the research to develop appropriate farming systems at high elevations.

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The Team feels that, as time goes on, there will be less emphasis on upland rice, and that gradually either land will be terraced for growing rainfed paddy, or upland rice will be replaced by higher-income crops such as soybeans, peanuts and mungbeans. Even today, upland rice provides only 4 to 5 percent of the national rice production, even though it occupies 14 percent

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of the land area devoted to rice. On the other hand, upland rice cannot be neglected because of the approximately one million farm families cultivating approximately 1.2 million hectares of upland rice. Nevertheless, as more profitable farming systems are developed, these farmers will likely shift away from upland rice.

Closer collaboration with the C.S.R./TROPISOILS team in the Sitiung area is advisable. Although there have been numerous contacts between this team and SARIF, joint planning of projects would reduce duplication and result in mutual reinforcement of programs.

12. It is absolutely essential for the success of SARIF's programs that adequate operating funds be provided. The Team is greatly concerned that funds will be inadequate to support the research programs that are being planned for the six experiment stations directly under SARIF, as well as for the proper maintenance of infrastructure and related activities which support the research program. In view of the cuts in the GOI development budget for 1986, and considering the inadequacy of operating funds, the Team suggests that no additional development funds be spent for building construction other than those already programmed and planned for the period ending in December 1986.

It is understood that access to additional external support for SARIF is being explored. Such should be welcome, especially during the current budget crisis. Moreover, such assistance could help in filling gaps in existing staffing and programs.

13. The Team concluded that the technical assistance provided to SARIF under the SAR Project by IADS/Winrock has been useful. This has contributed - and continues to contribute -, to an important degree, to the achievements to date in the establishment of SARIF as a going institution.

Continuing technical assistance in selected areas during the next five years is thought to be necessary to consolidate advances made and to move ahead in developing and implementing the research programs. Areas of specialization which are especially in need of assistance are: research direction and organization and management of support services, including planning and supervision for the development of the experimental fields.

Because of staff deficiencies in the area of agricultural economics and plant pathology, supplementing existing and/or expected staff on the short term with expatriate personnel would greatly enhance the overall research effort.

The Team urges that the continuing and additional technical assistance should be as operating personnel and not in advisory roles.

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APPENDIX I

SCHEDULE AND COMPOSITION* OF EVALUATION TEAM

January 5, 1986 (afternoon)	:	Arrive at Jakarta or Bogor
January 6.	:	Meeting at CRIFC, Bogor : Return to Jakarta
January 7,	:	AARD-Pasar Minggu, Jakarta
January 8.	:	To Padang - SARIF/Sukarami
January 9	:	Sukarami
January 10	:	Sitiung Research Station
January 11	:	Rambatan Experimental Farm
January 12-13	:	Sukarami - Meetings with SARIF's staff
January 14-16 I	:	Drs. Lebeau and Didi Atmadilaga to Taman Bogo (Lampung) and Kayu Agung via Jakarta
	II	Dr. Chandler and Mr. Sadikin to Pasar Miring (North Sumatra) and Lampineung (Aceh)
January 17	:	Sukarami
January 18	:	Sitiung (Drs Lebeau, Chandler and Didi Atmadilaga)
January 19-22	:	Sukarami
January 22	:	Departure to Jakarta (Mr. Sadikin- Dr. Didi Atmadilaga)
January 23	:	Departure to Jakarta (Dr. Lebeau and Dr. Chandler). Meeting at AARD - Pasar Minggu
January 24	:	Meeting at USAID - Jakarta
	:	Evening departure from Jakarta (except Team Leader)
January 26	:	Team Leader's departure

* F. Lebeau, Team Leader
P.F. Chandler
H. Sadikin
Didi Atmadilaga

APPENDIX II

RELATIONS TO OTHER INSTITUTIONS/ORGANIZATIONS

1. The AARD group of Institutions:

INSTITUTE	Important Relationship
CRIFC - Central Research Institute for Food Crops	General guidance to SARIF, participation in program development and evaluation and consultation by senior scientists.
BORIF - Bogor Institute for Food Crops	Pioneering and supportive research. Consultation with SARIF staff in programming planning and evaluation.
MARIF - Malang Research Institute for Food Crops	Breeding and improvement of Palawija crops for testing and verification in SARIF's farming systems program. Collaboration with SARIF in verification and testing of upland and high-elevation rice lines and varieties in the agro-climatic zones of Eastern Indonesia.
SURIF - Sukamandi Research Institute for Food Crops	Collaboration with SARIF in testing and verification of upland rice varieties and related farming systems in eco-systems of Western Java.
BARIF - Banjarbaru Research Institute for Food Crops	Collaboration with SARIF in testing and verification of upland rice varieties and related farming systems in eco-systems of Kalimantan.
MORIF - Maros Research Institute for Food Crops	Collaboration with SARIF in testing and verification of upland rice varieties and farming systems under dry climate conditions of Sulawesi.
Soil Research Institute (CSR)	Collaboration with SARIF in basic research on soil problems: aluminum and iron toxicity, erosion etc.
CAER - Center for Agro-Economic Research	Collaboration with SARIF in agro-economic surveys and in economic evaluation of farming systems.
Research Institute for Estate and Industrial crops, forestry and fisheries	The long-range SARIF program involves cooperative work with the several institutions in research on farming systems.
Research Institute for Animal Production	Cooperation in farming systems work: use of animals for draft power.

2. The Universities

IPB - Institute Pertanian Bogor & Gajah Mada University, Yogyakarta & University Pajajaran, Bandung & Sriwijaya University & University of North Sumatra, Medan & Andalas University, Padang & University Syahkuala, Aceh	!Training of research and technical !support personnel. ! !Participation of staff in programming !committee and as consultants to SARIF !staff. ! !SARIF scientists teach courses at !Andalas University and oversee thesis !research by Andalas students at !Sukarami.
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3. The International Agricultural Research Institutions.

IRRI - The International Rice Research Institute	Exchange of genetic lines and varieties, collaborative testing of varieties, exchange of information on farming systems, short-term training.
CIMMYT - The International Corn and Wheat Center	CIMMYT provides SARIF with wheat varieties for testing and contributes to farming systems research.
IITA - The International Institute of Tropical Agriculture	Work at IITA on grain legumes and root crops is particularly relevant to SARIF's work on Palawija Crops in farming systems. Some exchange of material has been made.
ICRISAT - The International Crops Research Institute for the Semi-Arid Tropics	Although ICRISAT's activities are related to semi-arid zones rather than wet zones which characterize most of Indonesia, its work with peanuts might have some usefulness in SARIF's work.
CIP - The International Potato Center	Some of the potato varieties being developed at CIP for the warm regions could find application in SARIF's farming systems programs.

AVRDC - The Asian Vegetable Research Development Center	Varieties of many of the vegetables developed at AVRDC for adaptability to warm climates should be explored for roles in farming systems in Sumatra.
CIAT - The International Center for Tropical Agriculture	CIAT's work on root crops and grain legumes as well as on rice would be useful in SARIF's rice and farming systems improvement program.
ISNAR - The International Service for National Agricultural Research	ISNAR's primary role is to assist in strengthening National Agricultural Research systems through improvement in organization, in management and in management training. SARIF could profit from linkages with ISNAR.

4. Other Relevant Institutions and Programs

TROPISOILS/CSR	TROPISOILS, financed largely by USAID and implemented by the Universities of Hawaii and North Carolina State, is studying problems of soil management in the Transmigration areas of West Sumatra; close program and project planning and sharing of results would benefit both programs.
IPP - The International Potash and Phosphate Institute	IPP is experimenting with different methods of land clearing in relation to soil fertility in the West Sumatra Transmigration area.
IDRC - International Development Research Center (Canada)	Research on farming systems
IRAT - Tropical Agronomic Research Institute (France)	Exchanges of rice varieties and lines

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5. Other Agricultural and Agro-Industrial Enterprises

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SARIF farming systems research program interact with these enterprises. Greater interaction could develop as SARIF broadens its farming systems mandate.

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These agro-industrial companies provide limited financial support for specific research projects. The amounts are small - \$2000.00 to \$5000.00 - but nevertheless make important contributions to operating budgets. The research supported is chiefly in plant protection and in soil fertility and plant nutrition.

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6. Other Important Relationships

Transmigration

With a research station (Sitiung) located in the major Transmigration Area, the work of SARIF is of direct relevance to the agriculture of the transmigrants. On-farm testing of varieties and cropping systems is being carried out in farmer's fields. Close cooperation is maintained with the extension services in the Transmigration areas.

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Extension and Farmers'
Organizations

SARIF staff maintains close contact with the provincial agricultural offices as well as with those of the Ministry of Agriculture - Collaborative trials in farmers' fields are carried out: joint participation in field demonstrations and visits to SARIF stations are common.

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Cooperatives

Make available to farmers, at the village level, fertilizers, seeds and agricultural chemicals. Also provides credits for inputs.

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To Broaden Agricultural
Development Strategy

The farming systems mandate of SARIF, as is also the case with the other research institutes, provides an opportunity for experimenting with highly diversified production systems which could result in better utilization of agricultural resources, increase in farm income and improved living standards of the rural population.

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APPENDIX III

SOME STATISTICAL INFORMATION CONCERNING SARIF

TECHNICAL/ADMINISTRATIVE STAFF

Academic Qualification	1979/1980	January 1986
Ph.D	1	4
M.S/M.Sc	1	24
Sarjana (4 years of college)	41	60
Sarjana Muda (3 years of college)	8	14
High School	94	206
Middle School	5	15
S.D. (Elementary school)	20	82
Non S.D.	5	21
T o t a l	175	426

TECHNICAL STAFF (PER DISCIPLINE)
(January 1986)

Disciplines	Academic Qualification			Total
	Ph.D	M.S./M.Sc	Ir/Drs	
Agronomy/Soil Science and Cropping Systems	2	5	16	23
Plant Breeding	1	5	8	14
Plant Physiology	1	4	12	18
Entomology	-	2	5	7
Plant Pathology	-	1	7	8
Technology	-	2	5	7
Agricultural Economics	-	3	5	8
Statistics/Computers	-	2	1	3
T o t a l	4	24	60	88

SARIF STAFF TRAINING

A. Long-Term

Degree	Completed		Continuing	Target April 1986
	1979	Jan.1986		
Ph.D	-	6	12	8
M.S./M.Sc.	-	30	24	55

B. Short-Term

Year	Completed	
	Overseas	In-Country
1978	-	4
1979	1	11
1980	2	31
1981	14	11
1982	4	20
1983	11	76
1984	7	10
1985	9	21
T o t a l	48	184

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SARIF'S STAFF REQUIREMENTS BY THE END OF PELITA IV.
(1984-1989)

Discipline	Ph.D	M.Sc.	Sar- jana	Sarj. Muda	High School	Middle School	Total
1. Director	1	-	-	-	-	-	1
2. Plant Breeding	3	9	6	-	20	10	48
3. Agronomy	3	9	12	-	18	7	49
4. Entomology	3	7	4	-	12	4	30
5. Pathology	2	7	4	-	12	3	28
6. Physiology	2	7	4	-	12	5	30
7. Economics	2	5	5	-	8	-	20
8. Technology/ Mechanization	1	3	2	-	4	3	13
9. Statistics	-	2	1	-	4	-	7
10. Laboratory	-	1	5	-	9	10	25
11. Communications	-	-	1	2	8	2	13
12. Workshop (Maintenance)	-	-	1	1	7	16	25
13. Administration	-	-	4	9	27	29	69
14. Experiment Stations	-	-	4	2	69	150	225
T o t a l	17	50	53	14	210	239	583

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SARIF'S TOTAL STAFF REQUIREMENTS - FELITA V

Disciplines	Ph.D	M.Sc.	Sar- jana	Sarj. Muda	High School	Middle School	Total
1. Director	1	-	-	-	-	-	1
2. Plant Breeding	5	10	8	-	26	15	64
3. Agronomy	5	10	10	-	24	12	61
4. Entomology	3	8	5	-	12	6	34
5. Pathology	3	8	5	-	12	4	32
6. Physiology	3	8	5	-	12	5	33
7. Microbiology	-	1	2	-	3	3	9
8. Economics	2	5	5	-	9	3	24
9. Technology/ Mechanization	1	4	4	-	6	4	19
10. Statistics	-	2	1	-	4	-	7
11. Laboratory	1	2	5	-	9	10	27
12. Communications	-	1	2	4	6	3	16
13. Workshop (Maintenance)	-	-	3	3	8	16	30
14. Administration	-	-	5	11	31	32	79
15. Experiment Stations	-	-	7	5	84	180	276
T o t a l	24	39	67	23	246	293	712

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BUILDING FACILITIES (m2)

LOCATION	1979	January 1986
SUKARAMI		
- Office + Laboratory	120	2,562
- Greenhouse	-	432
- Workshop (Maintenance) + Storage	950	4,379
- Houses	200	5,590
- Guest House	-	860
T o t a l	1,270	13,821
SITIUNG		
- Office + Laboratory	-	930
- Greenhouse	-	190
- Workshop (Maintenance) + Storage	354	2,150
- Houses	100	3,276
- Guest House	-	200
T o t a l	454	6,746
RAMBATAN		
- Office + Laboratory	-	144
- Greenhouse	-	-
- Workshop (Maintenance) + Storage	480	430
- Houses	145	356
T o t a l	625	930
BANDAR BUAT		
- Office + Laboratory	816	-
- Greenhouse	96	-
- Workshop (Maintenance) + Storage	1,140	-
- Houses	-	-
T o t a l	2,052	-
TAMAN BOGO		
- Office + Laboratory	-	414
- Greenhouse	-	190
- Workshop (Maintenance) + Storage	-	1,740
- Houses	-	1,166
T o t a l	1,215	3,110

Cont.

BUILDING FACILITIES (m²)

LOCATION	1979	January 1980
KAYU AGUNG		
- Office + Laboratory	-	-
- Greenhouse	-	-
- Workshop (Maintenance) + Storage	-	680
- Houses	-	684
T o t a l	-	1,364
FASAR MIRING		
- Office + Laboratory	-	780
- Greenhouse	-	190
- Workshop (Maintenance) + Storage	-	1,380
- Houses	-	1,044
T o t a l	-	3,394
LAMPINEUNG		
- Office + Laboratory	-	308
- Greenhouse	-	-
- Workshop (Maintenance) + Storage	-	780
- Houses	-	532
T o t a l	-	1,620
SUMANI		
- Office + Laboratory	-	420
- Greenhouse	-	120
- Workshop (Maintenance) + Storage	-	1,558
- Houses	-	618
T o t a l	300	2,716

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TEXTBOOKS, MAGAZINES, REPORTS, BOOKLETS/LEAFLETS,
REFERENCES, THESES AND PAPERS IN SARIF'S LIBRARY

Kind of documents	--- No. of Titles ---	
	1979//1980	Jan. 1986
1. Textbooks	96	1.764
2. Magazines	92	2.084
3. Reports	127	447
4. Booklets/Leaflets	4	564
5. References	20	37
6. Theses	-	17
7. Papers	84	236