USAID

balittan – sukarami
P.O. Box 34 Padang
West Sumatra, Indonesia

Balai Penelitian Tanaman Pangan – Sukarami
Sukarami Research Institute For Food Crops (Sarif)

PD-AAS-335

SARIF QUARTERLY REPORT

APRIL - JUNE 1984

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Project No.497 - 0263

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SARIF QUARTERLY REPORT

APRIL - JUNE 1984

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Project No.	:	497-0263
Grant No.	:	FY 77-14
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Project Assistance Completion Date	:	APRIL 12, 1986
Implementing Agency	:	SARIF (Through: CRIFC/AARD)
Participating Agency	:	International Agricultural Development Service (IADS)
Loan Implementing Agency:		USAID/AGR, JAKARTA

SARIF QUARTERLY REPORT

APRIL - JUNE 1984

C O N T E N T S

FOREWORD

The First Quarter 1984 was largely devoted to "Linkages and Outreach", with several important meetings and field days sponsored and conducted. During the Second Quarter the major efforts were made in "Building Bridges to the Future".

The "Proposal for Extending the SAR Project", after numerous revisions, meetings, amendments to the contract, was signed just before the deadline of April 12,1984. However, USAID deferred approval of any construction and commodity procurement not yet underway pending GOI clarification to provide the required funds for completing agreed upon construction and farm development. Finally on June 7, USAID was informed that BAPPENAS and the Directorate General of Budget had agreed to provide the additional budget of Rp.486,300,000, making a total of Rp.810,135,000. Out of this Rp.686,300,000 was earmarked for construction and farm development. With this assurance, USAID approved the continuation of all components of the SAR Project including construction and procurement.

Also USAID committed Rp.409,374,000 fixed amount reimbursable (FAR) funds for six construction projects underway.

The SAR Project Extension agreement assures the SARIF Project of adequate budgets for all needs through April, 1986.

Therefore, now many tentative plans are being finalized and implemented such as construction projects, farm development, training, short-term technical assistance, additional equipment and vehicles.

One June 20, TEAM 4 presented the latest revision of SAR Construction Project Program for 1984/85 according to funds approved. These revisions still required final approval by BAPPENAS and the Ministry of Finance before new projects at Taman Bogo, Sukarami, Rambatan, Sitiung, and Pasar Miring could be implemented.

Several meetings were held to get the third equipment order underway. The last items of the first order were cleared and a complete inventory was finished and much of the field equipment was distributed to various stations. The second order, mainly laboratory and seed processing equipment, was expected in July, but will be further delayed, due to shipping license problems. For completing the lists and specifications for the last order, several working committees were formed.

At Sukarami, with the completion and final inspection of the new office/laboratory/auditorium buildings, plans were made to shift to the new offices in July. The laboratories should start limited operation in October, when the equipment is installed and consultant arrive to training of staff.

The SARP/IADS Project Specialist and Team Lader, Dr K.O. Rachie, decided to terminate his assignment effective July 1,

1984, and retire to his home-base in Florida, USA. After presenting his Terminal Report to SARIF, the Rachies moved to Bogor in early May so that Dr Rachie could devote full time to preparing a draft of a proposed long-term (10-years) program for SARIF/Balittan-Sukarami. This draft, jointly authored by Dr A. Syarifuddin and Dr K.O. Rachie, was finished before the Rachies departed Indonesia on June 3,1984. It is presently being studied, revised and put on computer diskette for final editing at IADS headquarters.

Mr Jack Traywick was asked to assume the IADS Team Lader role in the interim period until Dr Pierre Antoine's arrival in early July.

Dr A. Syarifuddin, Director-SARIF attended a workshop on 'Cropping Systems' organized by IRRI in Sri Lanka, June 4-8, 1984.

Throughout this Quarterly Report details of research highlights, station development, staff training, technical assistance, linkates/extension, and status of finance will be discussed, along with the news of visitors, meetings, returning staff, and other Project operations.

The Headquarters at Sukarami continues to shape up with additional facilities, new and returning staff, equipment, conferences, short-term training courses, and many other activities.

RESEARCH HIGHLIGHTS

The First Semester 1984 was spent at pursuing research activities started during the wet season (WS) of the 1983/84 fiscal year and at preparing the dry season crops (DS) for the 1984/1985 fiscal year in Sumatra. A total of 46 research programs and 194 research activities, supported by 254 units of individual experiments, were planned in Sumatra. Some of them are being conducted in the dry season and the rest is planned for the coming wet season.

This report includes research highlights of some of the 1983/1984 research programs for upland rice, other rices, and palawija crops. The most interesting and significant results of these activities are highlighted under the following three sections:

1. Agro-Economic Studies - completed survey studies on economic analysis of corn in the central production area in West Sumatra.

2. Maturing Technologies - advanced development nearing the farmer release stage.

3. Program advances - interesting preliminary discoveries and contributions to component technologies.

This semi-annual report also includes a special section on the management of the "problem" soils of the Sitiung transmigration area and the potential new orientations for research in that area. It is presented in Appendix 3.

I. AGRO-ECONOMIC STUDIES

Research on corn and upland cropping systems continued from the last semester with a farmer survey at three sites in Central Lampung investigating the progress of transmigrant farmers and the role of corn in those households. It was found that farm incomes in the Lampung sample households was about Rp. 820,000 compared to the Sitiung (Central Sumatra) average of Rp. 380,000. The dynamic nature of the Lampung market for cassava and corn has led to major sales of these commodities. Farmers had problems obtaining stocks of the new corn varieties like Arjuna, although most farmers were interested in planting them. One important lesson for other transmigration sites is that flexibility in farmer planning is important. Lampung farmers have swithched crops from corn to cassava and also invested in three crops in response to changing profitability; transmigration scheme authorities in other areas should consider somewhat more flexibility in farmer response to market incentives.

In a separate survey, an economic analysis of corn producers in West Sumatra revealed that net revenue per hectare for fresh corn was over double that of grain corn. Improvement in roads has meant that some distant producers can avail themselves of fresh corn markets (such as Pekanbaru for Payakumbuh producers). However, fresh corn demand appears somewhat limited relative to the growing demand for grain corn from livestock feed producers.

In February, a brief data survey on pekarangan (house garden) crops in Sitiung was carried out in six households in Sitiung Iv. Evidence on a highly profitable part of the

transmigrant's farm was gathered showing that fruit trees, bananas, and palawija crops were important income earning activities. Small plot (0.25 ha) research has been recommended by Balittan economists before because farmers can supervise small plots easily, and the net value of intensely managed small plots is often higher than from main plot upland gardens.

Publications, January/June, 1984.

The Lampung Transmigrant Farmer: Results of a Survey (June, 1984)

Corn on Sumatra: Structure and Economics (May, 1984)

II. MATURING TECHNOLOGIES

This semester marked the advent of advanced technologies which may have a long term impact on the output and profitability of upland and cold tolerant rice. These varieties are now under review by a national board varietal testing.

First, a new promising upland rice line called Sitiung I B 3906 f-13-13-St-37 was identified. This line is a multiple cross between B 2714b-Pn-8 / IR 32 and Arias/IR-36 developed at Bogor in December 1976. In advanced multilocation yield trials, it yielded about 2 t/ha, a yield slightly higher than Sentani. However, in areas with soil problems such as in Rimbo Bujang, Sembawa and Payakumbuh it yielded about 4 t/ha, i.e. a yield 7 qwt/ha superior to Sentani. This new promising variety is resistant to lodging, drought, brown planthopper biotype 2 and is moderately resistant to blast (Pericularia oryzae).

Second, the new promising cold tolerant paddy rice line is called Batang Ombilin B 2980 b-Sr-2-6-2-3-2. It is a cross between IR 2061-214-3-8-2 and Kuning Galung, a local West Sumatran high elevation rice cultivar developed at Bogor in 1975. The rice line IR 2061-214-3-8-2 is also a cross between IR - 1561-149-1 (IR-8 Tandukan) and IR 1737 (IR-24 X Oryza nivara). In advanced yield trials, Batang Ombilin B 2980 b-Sr-2-6-2-3-2 yielded at least 4.5 t/ha, a figure higher than the previously released Batang Agam and Semeru. This new promising line showed constant yields (4,6 t/ha) at elevations of 1000 to 1500 meters. Below 1000 meters, it produced 5.4 t/ha. It also showed a good resistance to lodging, brown planthopper, and a moderate resistance to blast (P. oryzae).

III. PROGRAM ADVANCES

Interesting results from field crop experiments may lead to possibilities to increase total production and to improve the efficiency of annual crop husbandry with or without specific soil problems. The more significant highlights of completed research during the first semester 1984 are briefly discussed by program and discipline.

UPLAND RICE

1. Varietal testing. An international upland rice observation nursery (IURON) trial conducted at Sitiung during the wet season of 1983/1984 identified several promising lines among the 240 lines tested. Among the best performing lines which were well

adapted to Al toxicity, leaf and neck blast and which were able to produce higher yields, one can mention:

Line	Blast		Yield
	Leaf	Neck	t/ha
RAV 4072-42	2	13	2.1
ARC. 10372	3	30	2.2
B. 3664 f-Tb-21-5	5	43	1.7
IRAT. 132	3	-	1.6
IR. 12979-24-1	4	-	1.4
Sentani (check)	3	25	1.8

Testing of varieties/lines was conducted on different inoculated sources or races of blast (Pariaman, Bukittinggi, Padang Panjang, Batu Sangkar and Sitiung). Ten out of 25 varieties/lines tested in laboratory (Sumani) indicated moderate or good resistance to different races of blast. They were Colombia 1, Dawn, Dular, IRAT 123, IRAT 119, Nam sagui, Plut Nangka, Semeru 235, Norin 29 and ARC 14203.

An international Rice Blast Observation Nursery (IRBON) conducted at Sitiung and in farmers field at Payakumbuh during the 1983/1984 wet season identified 17 out of the 331 varieties/lines tested to be resistant to blast. They were:

No.	Lines	No.	Lines
1.	BG 379-2	10.	ITA 232
2.	DD - 91	11.	P 1034-6-4-2-3-3M
3.	ECIA - S 22204	12.	SR 3055-129-3-2-2
4.	HUNAN 14	13.	Suweon 299
5.	Carreon	14.	Suweon 300

6. IRAT 110
7. IRAT 140
8. ITA 123 (TOMI-3)
9. ITA 175
15. Suweon 303
16. Suweon 304
17. Suweon 305

2. Plant Nutrients

An experiment based on the Al status of the soil and studying the effect of sources and dosages of lime on yield of upland rice was conducted in farmers fields at Sitiung I Block A' during the 1983/1984 wet season. The highest yield (Sentani=3.9 t/ha was obtained by application of burnt dolomitic (50% Al exchangeable) lime; application of burnt limestone (50% Al exchangeable) resulted in yield of 3.5 t/ha, while the control only yielded 2.0 t/ha. In this experiment, data showed that increased applications of lime (levels of 50% to 200% of exchangeable Al) tended to reduce yields, indicating low lime requirements for optimum yields.

Another experiment was conducted on farmers field at Sitiung I A' during the 1983/1984 wet season to correlate rates of nitrogen application and plant spacings with upland rice yields (Sentani). Increasing rates of N application tended to increase plant height and number of panicles; the number of spikelets/panicles was also influenced by plant spacing. Plant spacing of 20 x 20 cm with 0 kg N/ha produced 2.9 t/ha while plant spacing of 40 x 10 and 40 x 20 cm with 90 kg N/ha produced 2.5 t/ha.

OTHER RICES

1. Plant nutrients. A trial on the effect of 2 rates of nitrogen applications on growth and yield of high elevation rice was conducted in farmers field in Bukittinggi, at an elevation of 800 meters during the wet season 1983/1984. It was verified that increasing rates of N applications increase rice yields. The highest yield for B 2980 b-Sr-2-6-2-3-2f was 5.4 t/ha and was obtained with an application of 180 kg N; plots without applications of nitrogen yielded 3.0 t/ha.

2. Cultural Practices. High yielding or local high elevation varieties did not respond to varying times of planting. However, time of planting may affect the growth and yield. The appropriate time for planting high elevation rice was between January and March: yields during that period were above 4.0 t/ha. Planting during the other months tended to reduce yields significantly. Yield reduction was related to a higher percentage of unfilled grains and and to the number of productive tillers.

3. Insect Pest. Detection of Brown planthopper (BPH) biotype of North Sumatra was conducted in farmers fields in Deli Serdang, Simalungun, Langkat and Labuhan Batu during the 1983-1984 planting season; different lowland rice varieties were used. PB - 56, PTB - 33 and Rathu Haenathi showed a good resistance to the biotype, while IR-36 was moderately susceptible to it.

4. Insect Control. An experiment on the effect of insecticides to control aphid seedling was conducted at Sitiung during the

1983/1984 wet season. Results indicate that Aldicab (30 gr per kilo of seeds) and Carbo sulfan (20 gr) effectively control aphid seedling. Infestations by aphids were only 8.2 and 4.3% until 6 weeks after planting while the untreated check was 14.2%.

5. Weed Control. A survey on the identification of weed species which host blast disease was conducted in Sitiung (farmers fields and SARIF's station) during the 1983/1984 wet season. Results indicate that the most important weed species were in increasing order of importance, Digitani sanguinalis (grass), Borreria leavis (broadleaf) and Oxonophus compressus (grass). However, the host of blast was also detected on D. Sanguina lis which is abundant in the planting area of upland rice.

Experiment on controlling weed by application of different herbicides was carried out at the Sitiung station during the 1983/1984 wet season. The results showed that Gasprin (2.0 l/ha), Saturni (2.0 l/ha), and Ronstar 3.0 l/ha) were effective to control upland rice weeds.

PALAWIJA CROPS

Corn. A series of preliminary yield trials of corn were conducted at the Rambatan and Sitiung stations during the 1983/1984 wet season. In Rambatan, under better soil conditions, optimal production was obtained from 5 lines out of the 26 varieties/lines tested. Corn yields are as follows:

Line	Yield (t/ha)
Pool 3-St-67	4.1
Pool 3-St-231	4.2
Pool 2-St-276	3.9
Pool 2-St-204	4.0
Pool 3-St-235	4.0
Arjuna (check)	4.1

At Sitiung, there were no yield data due to the heavy damage caused by wild pig. However, 5 lines were able to reach 50% silking above 60 days after planting.

An advanced multilocational yield trial conducted at the Rambatan and Sitiung stations and in farmers fields in Payakumbuh during the 1983/1984 wet season indicated that the yields of corn lines were lower than varietal check (Arjuna). The average yield of these lines at the three locations were:

Line	Yield (t/ha)
Pool -2 - St - 139	2.0
Pool -2 - St - 274	1.2
Pool -2 - St - 296	2.0
Pool -2 - St - 142	1.4
Pool -2 - St - 231	1.5
Pool -2 - St - 18	1.5
Arjuna (check)	3.1

Another plant nutrient trial carried out at Rambatan during the 1982/1983 dry season showed significant yield increases (2.5 t/ha) of the corn variety Harapan Baru, when fertilizer was applied

as deep as 15 cm with 6 t/ha straw mulch. Data indicated that a deep application of fertilizer coupled with an application of mulch increase yield significantly.

Wheat. Wheat yield trials carried out at the Sukarami station during the 1983/1984 dry season revealed that 11 out of the 25 varieties/lines tested produced significant yields above 2.5 t/ha. These breeding lines, their maturity and yield are shown below:

Varieties/lines	Day for maturity	Yield (t/ha)
C - 212-59	92	3.3
C - 213-13	90	3.1
Titmouse "S"	81	3.1
C - 346-1	100	2.8
Buck Cuck "S"	86	2.8
C - 351-3	93	2.5
R - 37 - GHL 121 - Rai-BB	88	2.5
C - 228 - 1	91	2.5
Maya - PVN "S"	83	2.5
C - 172-8	95	2.5
UPL - W2	100	2.5

Soybeans. An experiment on the effect of liming on yield of soybeans was conducted at the Sitiung station during the 1982/1983 wet season. The results showed that the optimum level of lime application corresponding to 100% exchangeable Al produced the highest yield (5.9 qwt/ha). Increasing liming beyond 100% exchangeable tended to reduce yield significantly.

Another experiment on the effect of liming on soybean was carried out in the Sitiung II Block A' farmers fields. The results showed that a lime application of 2 t/ha increased yield significantly. Interaction effects of liming x mulch and rhizobium x liming also showed positive results. The significantly higher yield (12.8 qwt/ha) was the result of the application of lime and mulch followed by the application of lime and rhizobium (12.6 qwt/ha).

Experiments on the effect of insecticides on pod borer of soybean showed that Decis 2.5 EC (1.0 ml a.i./ha) and Bayrusil 250 EC (675 ml a.i./ha) effectively controlled pod borer. The percentages of pod borer infestation were 4.5 and 9.2 while yields were 24.0 and 15.0 qwt/ha, respectively, from Decis and Bayrusil treated plots; the untreated check, on the other hand, had an infestation as high as 43.2% and yields were only 12 qwt/ha.

Cassava. Advanced yield trials conducted at the Sitiung station during the 1982/1983 dry seaon indicated that the Gading variety was superior to others (61.8 t/ha of wet tuber). Other new promising lines gave lower yield than Gading. They were: No. 236 (47.8 t/ha), W. 1656 (46.9 t/ha), No. 1548 (45.2 t/ha) and W. 1166 (48.0 t/ha).

Sweet Potato. Multilocational yield trials of varieties/lines in farmers fields at Baso Bukittinggi during 1983/1984 dry season revealed that 3 lines out of the 12 tested produced yields above 30 t/ha of wet tuber. These 3 lines CI-478-6-(OP)-Sr-2 (38.2 t/ha), I-307-(OP)-Sr-118 (34t/ha) and 17-5 (32.8 t/ha); their harvest indexes were 65,79, and 68 respectively. The check (Daya) yielded 30.4 t/ha with an harvest index of 78%.

Another multilocational yield trial conducted in Rambatan during the 1983/1984 dry season showed that new breeding lines could yield above 35.0 t/ha of wet tuber. These new breeding lines were:

Lines	Yield (t/ha)
CI-720-10 (OP)-St-27	46.6
CI-551-3 (OP)-St-13	40.8
CI-916-46 (OP)-Sr-11	37.3
I-151 (OP)-St-14	37.6
Tainan	36.8
AIS-243-2-1 (OP)-St-2	36.2
I-307 (OP)-St-82	35.0
Daya (check)	37.6

An advanced yield trial conducted in Sukarami during the 1983/1984 dry season showed that 4 lines gave a better yield than the check. These lines were CI-478-5 (OP)-Sr-9 (37.0 t/ha), CI-478-6 (OP)-Sr-2 (29.8 t/ha), CI-916-46 (OP)-Sr-11 (29.3 t/ha) and CT-916-46 (OP)-Sr-32 (29.1 t/ha); the check (Daya) yielded 23.2 t/ha. Harvest indexes were 64.6, 57.4, 77.4, 59.1 and 56.1%, respectively.

Cultural practice experiments conducted in farmers fields in Bukittinggi during the 1983/1984 dry season indicated that the variety x planting method gave the best yields. In theses experiments, Daya gave the highest yield (27.6 t/ha) when planted by the stolon by cycling method, Batagak (local variety) yielded 47.7 t/ha by upright planting and I-307 (OP) -St-10 yielded 32 t/ha, also by the upright planting method.

CROPPING SYSTEMS

Two long term component technology experiments on the association of upland rice and Lamtoro (Leucaena leucocephala) on depleted red yellow podzolic soils of Central Sumatra" were conducted during the 1983/1984 wet season at the Sitiung Experimental Farm.

In one experiment, lamtoro cultivars Peru, K-8, K-28 and Gung were established for 4 months in double hedgerows 2 meters apart before upland rice. Cultivar Sentani upland rice was sown in between the double hedgerows. Lamtoro plant growth was very good and they were coppiced at two months' intervals. Dry weights of lamtoro leaves and branches returned to the soil as green manure after 3 cuttings were for Peru: 4.6 t/ha, K-28: 6.3 t/ha, and Gung: 4.7 t/ha. These quantities were equivalent to nitrogen fertilizer rates of 157, 175, 215 and 159 kg N/ha respectively.

Interaction between upland rice and lamtoro was not quite favorable to upland rice. In fact, the yield of associated upland rice was significantly reduced as compared to the control (without intercropped lamtoro). This effect was especially strong

with rice yield associated with lamtoro cultivar K-28. This treatment gave a higher biomass, but the rice yield was significantly lower (1.7 t/ha). Pure stand upland rice yielded 2.8 t/ha, a yield far superior to all lamtoro - upland rice associations. Lamtoro adversely affected upland rice the most in the rows immediately adjacent to it. Management practices of lamtoro for intercropping with food crops need further investigations.

In another experiment, the results showed that different placement depths of TSP and lime (at the soil surface, and at depths of 15 cm, 30 cm, and 45 cm) had remarkable effects on the lamtoro biomass but not on the growth and yield of associated upland rice. In the control plot without TSP or lime, the lamtoro fresh biomass was only 2.6 t/ha, while in the plots with application of TSP and lime at 0, 15, 30, and 45 cm, the fresh biomass was 8.5, 8.8, 9.4, and 7.4 t/ha respectively. Lamtoro growth on these various plots did not affect significantly the growth and yield of associated rice.

UPLAND RICE MILLING IN SITIUNG TRANSMIGRATION AREA

Many efforts have been made by the Indonesian government to solve population problems that compound food requirements. One of these is the transmigration program in the upland area of Sitiung in the West Sumatra Province of Indonesia.

The main crop to support farmers food needs in the transmigration area is upland rice associated to a cropping

system. Upland rice, despite its good performance, presents some post harvest technology problems because of inherent genetic and environmental factors. To increase upland rice production, it is essential to keep losses low during milling operations. The magnitude of product loss in the milling process is directly function of the prototype of rice milling techniques applied in the field.

This research was conducted to evaluate rice production losses and also to identify ways which can help increase the profits of rice milling enterprises by farmers in transmigration areas in the future.

Surveys were carried out during October and November 1983. Later, through systems analysis, a model was developed. From this mathematical model it can be projected that the required number of rice milling units will be about 50 during the next five years. To date, 35 rice mill units have been installed from Sitiung I to Sitiung IV. Therefore, 15 additional units may be installed during Pelita IV by the Government. The suggestion was made to continue to study in detail the physical properties of upland paddy rice and to analyze the benefit cost ratio of rice milling enterprises in the Sitiung Upland Farming Systems.

MANPOWER RESOURCES AND STAFF DEVELOPMENT

1. Staff Profile:

A summary of the total staff strength in SARIF is given in Table 1 & 1a.

Total personnel as of JUNE 30,1984 is 509. Of these 223 are regulars and 286 are temporary employees. Total strength of technical staff is 230 (regulars: 116, and temporary: 114), and administrative staff is 279 (regulars: 107, and temporary: 172).

2. Training:

Details regarding long-term and short-term training courses offered to SARIF staff (from the beginning of the SAR Project until extension period - April, 1986) and projections during PELITA IV(1984-89) are summarised in Tables 2, 2(a) & 2(b).

a) Long-Term Training (Advanced Degree Program):

Following research staff from SARIF are continuing their further studies (M.S./Ph.D.) at different institutions in Indonesia, UPLB/Philippines, and USA. (Source of Funding: Non-USAID):

I. INDONESIA:

i) M.Sc.

1. Nasrun Husen	-	Agril. Economics -	IPB-Bogor
2. Abdul Kaher	-	Breeding -	"
3. Azman	-	Technology -	"
4. Darsono Sastrodipuro	-	Technology -	"
5. Syafei	-	Soil & Water Mgt.-	"
6. Yunizar	-	Plant Physiology -	"
7. Zadri Hamzah	-	Breeding -	"
8. Abdul Aziz	-	Breeding -	"

i) M.Sc.(Contd...)

9.	Aryulis	- Plant Physio.	UNPAD/Bandung
10.	D. Ketut Tastra	- Agril.Economics	"
11.	Adlis G.	- Cropping Systems	"
12.	Y. Zubaidah	- Plant Physio.	GAMA
13.	Irmansyah Rusli	- " "	"

ii) Ph.D.

1.	Asdirman Arief	- Agronomy	- IPB-Bogor
2.	Harry Subekti	- Statistics	- GAMA
3.	Djoko Suyamto	- Soil Science	- "
4.	Anischan Gani	- Plant Physio.	- UNPAD

II. UPLB - Philippines:

i) M.S.

1.	Abdul Gani	- Breeding
2.	Nusyirwan Hasan	- Entomology

ii) Ph.D.

1.	Zulkifly Zaini	- Plant Physiology
2.	Made Oka Adyana	- Agril. Economics

III. USA

M.S. At Sam Houston State Univ., Huntsville, Texas.

1. Mohammad Jusuf Yakup
2. Firdaus Kasim

During this reporting period, following two SARIF staff successfully completed their doctorate degrees (Ph.D.) in UPLB-Philippines and returned to the SAR Project to assume leadership in their respective fields:

1. Dr Rasidin Azwar - Plant Breeding
2. Dr Iswandi Hasan Basri - Agronomy

b) Short-Term Training (Non-degree Research & Training):

Following two SARIF staff successfully completed their two-months intensive English language training at NAR-II/Bogor:

1. Mr Zainal Lamid
2. Mr Abdul Aziz

During the reporting period, none attended overseas short-term training (non-degree research); however, following SARIF staff were identified to undergo different training courses:

1. Mr Edial Afdi Jr.Plant Physiologist	- 3 months training on Chemical Analytical Procedures at IRRI.
2. Mr Nasrun D. Jr.Plant Pathologist	- 4 months training on Upland Rice at IRRI.
3. Mr Nasrul Jaleed Jr.Plant Physiologist	
4. Mr Syarial A. Jr.Agronomist	
5. Mr Ishak Manti Entomologist	3 months training on Integrated Pest Management at IRRI
6. Mr I. Ketut Tastra Jr.Post-Harvest Tech.& Leader,Cropping Systems	1-week Computer Workshop & 2½ months training on Farming Systems at IRRI.
7. Mr Djam'an Head, Finance Dvn. SARP/CRIFC, Bogor	2½ months training on Agril. Research Management at USDA-Washington,DC,USA.

3. English Language:

Miss Linda Trippick, VSO (Voluntary Services Overseas of the British Council, Jakarta) is expected to join SARIF sometime during October,1984, for teaching intensive English language to SARIF staff.

VISITORS/MEETINGS

APRIL 4-5 : Dr E.E. Saari, Wheat-Pathologist, CIMMYT-Bangkok. Held discussions with SARIF staff regarding collaborative research between CIMMYT and SARIF.

" 14-17 : Dr Rainer Schultze-Kraft, Germplasm Agronomist-Tropical Pasures Program, CIAT-Colombia.

MAY 19-24 : Dr Pierre Ph. Antoine, Program Officer, IADS-HQ(USA) - Official visit to Sukarami, CRIFC/Bogor, and USAID-Jakarta.

" 21 : Dr A. Jugsujinda, Soil & Water Mgt.Specialist-SARP/IADS presented a seminar at Sukarami on "Association of Upland Rice and Lamtoro (Leucaena leucocephala) on Depleted Red Yellow Podzolic Soils of Central Sumatra".

JUNE 11 : Mr O' Rierdan, Engineer from USAID-Jakarta.

12-16: Dr J.M. Spain, Pasture Agronomist, CIAT-Colombia.

Seminar on "Management of Tropical Soils" was given by Dr Spain at Sukarami.

25 : Mr David Merrill, Director-AID/East Asia Dvn., USAID-Washington;

Mr Philip Tjakranatu, Civil Engineer, USAID, Jakarta;

Dr Martin Hanratty, Agril. Economist, USAID, Jakarta; and

Mr Alan R. Hurdus, Agronomy Advisor(Research), USAID-Jakarta.

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TABLE I

BALITTAN - SUKARAMI - SARIF

TECHNICAL/ADMINISTRATIVE STAFF

As of June 30, 1984

LOCATION	TECHNICAL STAFF			ADMINISTRATIVE STAFF			TOTAL	
	P.N.	Hnr	TOTAL	P.N.	Hnr	TOTAL	P.N.	Hnr
BALITTAN SUKARAMI	68	54	122	46	68	114	114	122
SUB. BALITTAN :								
- SUMANI	12	14	26	2	9	11	14	23
- SITIUNG	-	-	-	1	-	1	1	-
- KAYU AGUNG	-	-	-	1	-	1	1	-
- BIRASTAGI	10	14	24	12	26	38	22	40
- PASAR MIRING	-	3	3	1	2	3	1	5
KEBUN PERCOBAAN:								
- SUKARAMI	-	1	1	6	19	25	6	20
- BANDAR BUAT	-	2	2	5	11	16	5	13
- SUMANI	-	-	-	1	2	3	1	2
- SITIUNG	-	8	8	4	8	12	4	16
- RAMBATAN	2	9	11	6	9	15	8	18
- GURGUR - BALIGE	2	2	4	5	12	17	7	14
- LAMPINEUNG	1	5	6	2	3	5	3	8
- TAMAN BOGO	18	1	19	14	1	15	32	2
- KAYU AGUNG	3	1	4	1	2	3	4	3
TOTAL	116	114	230	107	172	279	123	286

PN : Pegawai Negeri - Regular Staff

Hnr : Honorer - Temporary Staff

TOTAL SARIF SARIF = 509

TABLE I(a)

BALITTAN - SUKARAMI - SARIF
TECHNICAL/ADMINISTRATIVE STAFF
As of June 30, 1984

STATION	ACADEMIC QUALIFICATION																				TOTAL	
	Ph. D		MS / M.Sc		SARJANA		SARMUD		SLTA		SLTP		S D		NON S D			
	P.N.	Hnr	P.N	Hnr	P.N	Hnr	P.N	Hnr	P.N	Hnr	P.N	Hnr	P.N	Hnr	P.N	Hnr	P.N	Hnr
BALITTAN SUKARAMI	3	-	5	-	20	17	8	5	52	74	-	4	1	16	-	5	89	121
- KPTP SUKARAMI	-	-	-	-	-	-	-	-	4	2	-	2	2	2	-	14	6	30
- KPTP BANDAR BUAT	-	-	-	-	-	-	-	-	3	3	-	-	1	4	-	7	4	14
- KPTP RAMBATAN	-	-	-	-	1	1	-	-	4	10	1	-	3	7	-	-	8	17
- KPTP LAMPINEUNG	-	-	-	-	6	3	-	-	5	15	-	3	-	2	-	-	11	23
SUB BALITTAN SUMANI	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	1	2
- KPTP SUMANI	-	-	-	-	-	-	-	-	1	-	-	-	-	3	-	-	22	40
SUB BALITTAN BRASTAGI	-	-	1	-	6	5	-	-	15	28	-	4	-	3	-	-	1	-
- KPTP BRASTAGI	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	7	14
- KPTP GURGUR	-	-	-	-	-	-	-	-	5	4	-	-	2	5	-	-	1	-
SUB BALITTAN K. AGUNG	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3
- KPTP KAYU AGUNG	-	-	-	-	-	-	-	-	4	1	-	-	-	2	-	-	32	2
- KPTP TAMAN BOGO	-	-	-	-	-	-	-	-	5	2	3	-	24	-	-	-	1	-
SUB BALITTAN SITIUNG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	16
- KPTP SITIUNG	-	-	-	-	-	-	-	-	4	9	-	1	-	-	-	6	1	5
SUB BALITTAN P.MIRING	-	-	1	-	-	1	-	-	-	4	-	-	-	-	-	-	10	-
PETUGAS BELAJAR																		
- I P B	-	-	1	-	9	-	-	-	-	-	-	-	-	-	-	-	7	-
- UNPAD	-	-	1	-	6	-	-	-	-	-	-	-	-	-	-	-	6	-
- U G M	-	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	3	-
- UPLB (PHILIPPINES)	-	-	1	-	2	1	-	-	-	-	-	-	-	-	-	-	2	-
- SHSU (U.S.A)	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-		
TOTAL	3	-	14	-	56	28	8	5	105	159	4	15	33	42	-	37	223	286

TOTAL SARIF STAFF = 509

TABLE 2 LONG-TERM & SHORT-TERM TRAINING OFFERED TO SARIF STAFF

TRAININ	Original Target (per Contract)		COMPLETED (Until June,1984)		CONTINUING STUDIES				REVISED TARGET (overseas) APRIL 1986	
					OVERSEAS		IN-COUNTRY			
	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.	M.S.	Ph.D.
A. LONG-TERM	27 (5 USA) (22 UPLB) & 28 (GOI) 55	7 (2 USA) (5 UPLB) & 1 (GOI) 8	2 (USA) 4 (UPLB) 14 (GOI) -- 20	2 (USA) 2(UPLB) 1 (GOI) - 5	2(UPLB) 2 (USA)	2(UPLB) --	13	4	10	5
					TOTAL M.S. : 4 + 13 = 17 Ph.D.: 2 + 4 = 6					

B. SHORT-TERM (Non-Degree Research & In-Service Training) (2-6 months) — 10 — 36

	COMPLETED	
	OVERSEAS	IN-COUNTRY
1978	--	4
1979	1	11
1980	2	31
1981	14	11
1982	4	20
1983	11	76
	32	153

Note: Short-term Training - Overseas: USAID Loan Funds
" " " - In-Country: GOI Funds

C. SHORT-TERM TRAVEL GRANTS (For attending Conferences/ Observation Tours) — No. Not Specified — 12

TABLE 2(a) DISCIPLINE-WISE SUMMARY OF LONG-RANGE TRAINING - SARIF

DISCIPLINE	M.S.					Ph.D.				
	COMPLETED		CONTINUING			COMPLETED		CONTINUING		
	Over-seas	Indo-nesia	Over-seas	Indo-nesia	TOTAL	Over-seas	Indo-nesia	Over-seas	Indo-nesia	TOTAL
Agril. Economics	-	-	-	2	2	-	-	1	-	1
Plant Breeding	2	1	2	2	7	2	-	-	-	2
Agronomy/Soil Science	3	6	1	2	12	2	1	-	2	5
Entomology	-	1	1	-	2	-	-	-	-	-
Plant Pathology	-	-	-	-	-	-	-	-	-	-
Plant Physiology	-	3	-	5	8	-	-	1	1	2
Post-Harvest Technology	--	2	-	2	4	-	-	-	-	-
Statistics	1	1	-	-	2	-	-	-	1	1
TOTAL	6	14	4	13	37	4	1	2	4	11

Overseas: USA & UPLB,Philippines

Indonesia: IPB-Bogor; GAMA; & UNPAD.

TABLE 2(b) SARIF STAFF REQUIREMENTS BY THE END OF PELITA IV

DISCIPLINE	Ph.D.	M.S.	Sarjana (B.S./Ir)	Sarj.Muda (B.A.)	High School	Middle School	TOTAL
DIRECTOR	1	-	-	-	-	-	1
PLANT BREEDING	3	9	6	-	20	10	48
AGRONOMY	3	9	12	-	18	7	49
ENTOMOLOGY	3	7	4	-	12	4	30
PATHOLOGY	2	7	4	-	12	3	28
PHYSIOLOGY	2	7	4	-	12	5	30
ECONOMICS	2	5	5	-	8	-	20
POST HARVEST/ MECHANIZATION	1	3	2	-	4	3	13
STATISTICS	-	2	1	-	4	-	7
LABORATORY	-	1	5	-	9	10	25
COMMUNICATIONS	-	-	1	2	8	2	13
WORKSHOP	-	-	1	1	7	16	25
ADMINISTRATION	-	-	4	9	27	29	69
EXPERIMENT STATIONS	-	-	4	2	69	150	225
TOTAL	17	50	53	14	210	239	583

FACILITIES PLANNING, DEVELOPMENT, AND EQUIPMENT PROCUREMENT

PLANNING

With an additional budget for construction provided from GOI totalling over five hundred million rupiah, speeded up replanning and finishing of detailed plans and specifications continued during the last months of the semester. Also an additional 184.6 million rupiah was provided for farm development. Meetings were held in Bogor towards the end of the 2nd quarter to make specific arrangements for best utilizing the farm development funds through contracts and through non-contracted work by institute staff and farm machinery.

USAID engineer reviewed and approved plan specifications, cost estimates and land rights for three new projects at the Sukarami, Sitiung, and Kayu Agung stations.

Delays in replanning for using the additional budgets will make it necessary to revise the implementation schedule for station development that was approved at the last Bi-Annual Meeting. For the record this is about the fifteenth time during this Project that station developement implementation schedules have had to be revised, mainly because of budgetary changes and lengthy construction contracting procedures. The new schedule will be ready early in July. With time running out for this Project, it is hoped that this new schedule can be followed. Otherwise it will not be possible to complete all planned construction/development projects.

In addition to the three projects mentioned above, revised budgets, plans and specifications were being completed for five additional projects as follows:

1. Taman Bogo. New office/laboratory, 20 Houses, Barracks, Service Center, renovation of old service buildings, plus drying floor, Screen House, electrical and civil works.
2. Sukarami V. 24 Houses (3-120 m^2 units), Barracks, Service Center, Working Shed, Screen Houses and site development.
3. Rambatan. 7 Houses, Office/Laboratory, Guest House, Service Center, drying floor, Screen Cage, electrical and water systems, roads.
4. Sitiung III. 46 Houses, Guest House, Screen Houses, Screen Cages, utilities and site work.
5. Pasar Miring II. Office/Laboratory, 4 Houses, Drying floor (completed), utilities and site works.

These five projects, will cost about 1.68 billion rupiah.

DEVELOPMENT

Final inspection of Sukarami 2-A and III plus Sitiung I projects were conducted. Some problems remain to be completed either by the contractor or by an additional subcontract.

Tendering for Sitiung II was completed. For Kayu Agung I the 18 bids were all too high. Some solution is being sought to prevent re-tendering. At the end of the 2nd quarter the Sukarami IV contract had not been finalized. Also the problems delaying the two farm development contracts for Sukarami and Sitiung still had not been resolved.

Meetings were held to implement the use of a 13 million rupiah budget for farm development, distributed among six stations.

Now that tractors and farm machinery has been distributed, and an operational training course completed, in-service training will continue on each station along with the land shaping work. The new British farm mechanic VSO will assist in this work.

EQUIPMENT PROCUREMENT

Finally the first order was completed with the arrival of the 15 electrical generators and spare parts. The second order, mainly laboratory and seed processing equipment, will be arriving around late August or early September.

Not much progress was made on getting the third equipment order bidding underway. At a meeting in Bogor in late June with TransCentury and other parties, it appeared that issues were finally settled so that about July 25th, TransCentury could advertize for bids. It was decided that the bid for the radio sets must include license, installation and service for the 8 stations. If enough bids are in by

August 15th, Jack Traywick, and possibly Mr. Djam'an will review them in Washington or New Jersey.

For preparing the 4th order, five committees were formed in Sukarami. They will prepare suggested lists, with specifications if available on (1) laboratory equipment, (2) Office & Communication, (3) Field & Research Equipment & Vehicles, (4) Post-harvest and Seed Processing Equipment, and (5) Computers, Calculators, Software, etc. All committees will work on spare parts and special materials needed. Another committee is also working on library development, furniture, journals, books, and other requirements. The goal is to place all orders before the end of this year.

LINKAGES/EXTENSION

The SARIF linkages continued to expand and develop during the First Semester. Important meetings and field days were held during this period.

1. Field Day at Sitiung: On January 17, both the Governor of West Sumatra, Mr Azwar Anas and the Bupati of Solok, Mr Hasan Basri participated the field visit jointly organized by SARIF and Extension Services of West Sumatra. Around 600 nearby farmers attended this field day and observed field experiments and demonstrations at Sitiung.

2. SARIF/TROP-SOILS Joint Meeting: Dr Syarifuddin led a team of SARIF/SARP staff on January 31 to have a joint discussions and field visits with the Trop-Soils Project in Sitiung.

3. National Upland Cropping Systems Symposium: The Governor of West Sumatra, Mr Azwar Anas inaugurated the national Upland Cropping Systems Symposium at SARIF-Sukarami on February 8 which was attended by Mr Sadikin S.W., Head,AARD, and more than 80 persons from different parts of the country participated. During the symposium, a field visit to Sitiung was also organized by SARIF, which was widely covered by the television network.

4. Joint IRRI/AARD Meeting: Annual meeting on collaborative rice research between IRRI and AARD was held here in Sukarami from February 28 to March 3,1984. IRRI team was led by the Director-General, Dr M.S. Swaminathan and the AARD/CRIFC team was led by Mr Sadikin.S.W., Head, AARD. Major topics

included upland rice, water management, rice pests and hybrid rice. A field trip to Sitiung was arranged by SARIF during this joint meeting.

During the First Semester, several groups of farmers from Lampung and West Sumatra; Members of Parliament (DPR) from West Sumatra, West Java, West Kalimantan, and North Sumatra; and High School and University Students from the University of Andalas and IKIP-Padang visited SARIF headquarters in Sukarami to familiarize with the research program activities underway.

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TECHNICAL ASSISTANCE

PERSONNEL

K.O. Rachie	Project Specialist (Until June 3, 1984)
J.D. Traywick	Facilities Development/ Engineering Specialist
A. Jugsujinda	Soil & Water Management Specialist
D.H. Perry	Agricultural Economics Specialist
P.S. Srinivasan	Administrative Specialist

RESIDENT SPECIALIST ACTIVITIES

All five SARP resident specialists were directly involved in consultation and meetings with their Indonesian colleagues. During this reporting period, Soil & Water Management Specialist attended a workshop in the International Rice Research Institute, Los Banos, Philippines (April 1-7) and then proceeded on home leave (April 8-30); and the Project Specialist completed his two-year assignment.

A summary of technical assistance (man-months) so far completed and projection until April,1986 is given in Table 8.

Project Specialist. The PS (KOR) incorporated all changes on the contract amendment and the final official document for extension of the SAR Project was signed by all parties at Jakarta on April 11,1984. On behalf of the President, IADS, Project Specialist signed this Amendment No.2. He prepared his terminal

report of activities and accomplishments and submitted to SARIF before proceeding to Bogor on May 3,1984 for preparing Long Range Program for SARIF. He completed this report on Long Range Program and submitted a copy to SARIF before his departure from Indonesia on June 3,1984, for comments and consideration. During the interim period (April 22 to June 30, 1984), Facilites Development/Engineering Specialist (JDT) was acting as Project Specialist.

Facilities Development/Engineering Specialist. The Agricultural Engineer (JDT) was directly involved in several station development activities. During this reporting period, he made three trips to Jakarta/Bogor for facility planning, implementation meetings and discussions with SARIF staff, USAID officers and engineers, with TEAM IV architects, TRANS CENTURY, and others. He was acting as Project Specialist/IADS Team Leader from April 22 to June 30,1984 after Dr K.O. Rachie's departure for Bogor. Also he assisted for distribution of tractors and farm machinery to five of the research stations, and visited experiment stations and advised on use of farm machinery and farm development work. He was also busy on equipment procurement including finalizing inventory on first order and arrangements for third order placements. He set up meetings to discuss long range equipment and for preparing fourth order.

Soil and Water Management Specialist. The Soil and Water Management Specialist (AJ) was attending the workshop on Wetlant Soils at the International Rice Research Institute, Los Banos, Philippines, April 1-7, and then proceeded on home leave with his family to Thailand from April 8 to 30,1984. He visited Sitiung twice during this second quarter - May 8-10 and June 4-6. He presented a seminar in Sukarami on May 21 on the "Association of Upland Rice and Lamtoro (Leucaena leucocephala) on Depleted Red Yellow Podzolic Soils of Central Sumatra". Also he coordinated the field trip of Dr J.M. Spain, Pasture Agronomist from CIAT-Colombia. Other activities included experimental data processing and in preparing articles for the technical bulletin periodically brought out by SARIF (Penelitian Pemberitaan Sukarami). A collaborative research project between Lousiana State University, USA, and SARIF funded by USAID has been approved by AARD, and this was possible by the initiative taken by the Soil & Water Man.gement Specialist.

Economics Specialist. The Agricultural Economist (DHP) was heavily preoccupied with the field work and the formulation of a computer training course for researchers and administrators in Sukarami. The research on corn and upland cropping systems continued with a farmer survey at three sites in Central Lampung investigating the progress of transmigrant farmers and the role of corn in these households. It was found that farm incomes in the Lampung sample households was about Rp.780,000 compared to the Sitiung average of Rp.380,000. The dynamic nature of the

Lampung market for cassava and corn has led to major sales of these commodities. Evidence on a highly profitable part of the transmigrant's farm was gathered showing that fruit trees, bananas, and palawija crops were important income earning activities. Small plot (0.25 ha) research has been recommended by Balittan economists before because farmers can supervise small plots easily, and the net value of intensely managed small plots is often higher than from main plot upland gardens.

Administration Specialist. The Administrator (PSS) continued his active role in providing logistic and administrative support to the SARP staff, managing local accounts (including direct settlement of accounts with the IADS HQ, obtaining reimbursements from USAID,etc.), assistance with clearance of shipments (both air and ocean freight shipments of personal effects of Dr K.O. Rachie and Dr D.H. Perry), and overseeing the routine secretarial work. He continued his active role in implementing training plans for 1984/85, and attending other administrative matters including general correspondence. He was also supervising SARP/IADS Padang Office-cum-Guest House.

TABLE 8. SUMMARY OF TECHNICAL ASSISTANCE - SAR PROJECT

NAME	POSITION	STARTING DATE	TERMINATION DATE	TOTAL MAN-MONTHS	
				MID-1984	APRIL 1985
Dr F.J. Bell	Project Supervisor	Sept.15,1979	July 1,1981	22	22
Mr G. Revilleza	Admn. Officer	Sept.14,1980	Sept.1,1982	24	24
Dr U. Scholz	Agril. Geographer	June 1, 1981	Dec.31,1982	19	19
Mr J.D. Traywick	Farm Dev.Specialist	Jan. 8, 1980	--	54	75
Dr A. Jugsujinda	Soil & Water Management Specialist	April 15,1982	--	27	48
Dr D.H. Perry	Agril. Economist	July 1,1982	Oct.15,1984	24	26
Dr K.O. Rachie	Project Supervisor	July 1,1982	July 1,1984	24	25
Mr P.S. Srinivasan	Admn. Officer	Nov.22,1982	--	19	40
Dr P.Ph. Antoine	Project Supervisor	July 8,1984	--	-	22
			TOTAL	213	301

F I N A N C E

I. Budgets:

A. Grant Funds: Total revised budget approved for the extension period of the SAR Project (from April 1984 to April 1986) is US$2,985,500 for the Grant Funds which includes US$485,500 for Technical Assistance. from Loan Funds

B. Loan Funds: During the extension period, the budget amount for Loan Funds has been reduced to US$497,700 from the original allocation of US$1,150,000 for Training.

C. GOI Funds: Total GOI budget allocation for the past three years (1981-82 - 1983-84) and for the current year (1984-85) is Rp.4,28 billion (Table 5).

II. Fund Release and Expenditures:

Detailed statements regarding expenditures against Grant and Loan Funds, and GOI contribution for the period ending JUNE 30,1984 are summarised in the following Tables:

Grant Funds: Table 3: This includes budget allocation and expenditures as of June 30,1984 for Technical Assistance (Resident Specialists, Consultants, IADS HQ Exp/Overhead, etc.). From the revised total allocated budget of $2.98 million, 63% or $1.75 million has so far been spent under Grant Funds.

Loan Funds: Table 4: From the revised allocated budget of $497,700 for training (only for short-term - non-degree research and training) US$259,734 or 52.5% has so far been utilized.

During the reporting period, IADS Overhead has been reduced to 18.87% from the previous rate of 22.45%.

GOI Counterpart: Table 5: Summary of GOI counterpart contribution. From the total allocated Rupiah budget for the past three years (FY 1981-82 - 1983-84) and for the current year (FY 1984-85) of Rp.4.28 billion, only 58% has been shown as expenditure for the period ending June 30,1984.

Table 6: Breakdown of GOI contributions/ expenditures by two-centres -- SARP/Sukarami and SARP/Bogor.

Table 7: Summary of GOI expenditures in support of Technical Assistance.

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TABLE : 3

Summary of Disbursements (for the period ending June 30, 1984)

GRANT FUNDS in US$

EXPENSE ITEM	BUDGET 1979-'86	EXPENDITURES Previous $	Current $	Total $	% EXP/BUD
Direct Cost					
. Resident Specialist	1,979,200	1,185,507.20	106,948.19	1,292,455.39	65.30
. Consultants	259,800	124,533.27	-	124,533.27	47.93
. IADS HQ Staff & exp	170,200	109,694,38	7,394.76	117,089.14	68.80
Total Direct Costs	2,409,200	1,419,734.85	114,342.95	1,534,077.80	63.68
IADS Overhead 1/	526,600	310,548.01	25,670.oo	336,218.01	63.85
Local Staff Support	33,700	--	10,167.28	10,167.28	30.17
Pre-Contract Expenses	16,000	--	--	16,000.oo	-
GRANT TOTAL $	2,985,500	1,746,282.86	150,180.23	1,896,463.09	63.52

*/ Includes US$ 485,500 from LOAN FUNDS

1/ Adjusted at 18.87%

Note: Data provided by IADS HQ, USA.

TABLE 4

Summary of Disbursements (for the period ending June 30, 1984)

LOAN FUNDS in US$

A. Training

EXPENSE ITEM	BUDGET 1979-'86	EXPENDITURES			% EXP/BUD
		Previous	Current	Total	
• International Training Program					
I. Advanced Degree Training	101,700	92,871.01	207.29	93,078.30	91.52
B. Other Training	306,900	120,546.36	925.41	121,471.77	39.58
Total $	408,600	213,417.37	1,132.70	214,550.07	52.51
II. IADS Overhead 1/	89,100	46,317.21	254.30	46,571.51	57.27
TOTAL	497,700	259,734.58	1.387.00	261,121.58	52.47

/ Adjusted at 18.87%

B. Construction : No drawdown

C. Equipment/Vehicles : $500,000 (Estimated).

Table 5

Summary of GOI budget, funds, received, and balances (as of June 30, 1984)

DIP YEAR	BUDGET ('000) Rp.	TREASURY FUNDS RECEIVED	EXPENDITURES	BALANCE IN BUDGET	BALANCE ON HAND	% OF BUDGET
1981 - 82	847,720	808,825,076.89	798,706,271.89	49,013,728.11	10,118,805	94.22
1982 - 83	1,126,109	1,061,839,535.79	1,056,102,076.29	70,006,923.71	.737,459	93.78
1983 - 84	1,447,290	586,327,000.oo	576,597,850.oo	870,692,150.oo	9,729,150	39.84
1984 - 85	857,000	132,267,000.oo	65,734,212.oo	791,265,788.oo	66,532,788	7.67
T O T A L Rp.	4,278,119	2,589,258,612.68	2,497,140,410.18	1,780,978,589.82	92,118,202	58.37

Table 6

Breakdown of GOI budgets, expenditures and balances (as of June 30, 1984)
(by Costs Centers - SAR/Sukarami & SAR Bogor)

DIP YEAR	BUDGET ('000) Rp.	EXPENDITURES PREVIOUS	CURRENT	TOTAL	BALANCE	% EXP/BUD
SAR/SUKARAMI						
1981 - 82	776,000	730,841,577	1,257,399.89	732,098,976.89	43,901,023.11	94.34
1982 - 83	1,049,032	949,629,376.24	40,201,650.05	989,831,026.29	59,200,973.71	94.36
1983 - 84	1,384,463	520,073,297	11,120,703.oo	531,194,000.oo	853,242,000.oo	38.37
1984 - 85	857,000	-	65,734,212.oo	65,734,212.oo	791,265,788.oo	7.67
Sub-Total	4,066,468	2,635,287,051.24	118,313,964.94	2,318,858,215.18	1,747,609,784.82	57.02
SAR/BOGOR						
1981 - 82	71,720	66,546,245.oo	61,050.oo	66,607,295.oo	5,112,705	92.87
1982 - 83	77,077	66,250,750.oo	20,300.oo	66,271,050.oo	10,805,950	85.98
1983 - 84	62,854	41,694,095.oo	3,709,755	45,403,850.oo	17,450,150	72.24
1984 - 85	-	-	-	-	-	-
Sub-Total	211,651	174,491,090.oo	3,791,105	178,282,195.oo	33,368,805	84.23
T O T A L	4,278,119	2,809,778,141.24	122,105,069.94	2,497,140,410.18	1,780,978,589.82	58.37

TABLE 7

GOI Expenditures in support to Technical Assistance (as of June 30,84)

XPENSE ITEM fiscal year)	: BUDGET Rp. ('000)	: EXPENDITURES : Previous	: Current	: T o t a l	: BALANCE	: % EXP/B
P Budget 1981-82						
al Employees	2,640	2,500,000	-	2,500,000	180,000	93
ice Expense	2,500	2,500,000	-	2,500,000	-	100
vel IADS Staff	7,500	7,500,000	-	7,500,000	-	100
el Costs	10,000	1,000,000	-	1,000,000	-	100
se Rent/Maint	16,000	16,000,000	-	16,000,000	-	100
o service	4,500	4,500,000	-	4,500,000	-	100
umentation	1,000	1,000,000	-	1,000,000	-	100
ipment	7,500	7,500,000	-	7,500,000	-	100
nsportation	3,000	3,000,000	-	3,000,000	-	100
t Permit Etc	1,400	1,400,000	-	1,400,000	-	100
- Total	47,080	46,900,000	-	46,900,000	180,000	99
IP Budget 1982-83						
al Employees	4,500	4,075,000	-	4,075,000	425,000	90
ice Expense	2,000	2,000,000	-	2,000,000	-	100
ipment	5,000	5,000,000	-	5,000,000	-	100
vel IADS Staff	15,000	15,000,000	-	15,000,000	-	100
se Rent/Maint	20,000	20,000,000	-	20,000,000	-	100
el Costs	2,500	2,487,810.50	-	2,487,810.50	12,189.50	99
o Service	7,050	7,050,000	-	7,050,000	-	100
umentation	3,000	3,000,000	-	3,000,000	-	100
nsportation	800	800,000	-	800,000	-	100
t Permit Etc	2,000	2,000,000	-	2,000,000	-	100
- Total	61,850	61,412,810.50	-	61,412,810.50	437,180.50	99

TABLE 7 (contd..)

GOI Expenditures in support to Technical Assistance (as of June 30, 1984)

EXPENSE ITEM (by fiscal year)	BUDGET ('000) Rp.	EXPENDITURES PREVIOUS	CURRENT	TOTAL	BALANCE	% EXP/BUD
DIP Budget 1981-82						
Local Employees	4,599	4,584,000	-	4,584,000	15,000	99
Office Expense	2,000	2,000,000	-	2,000,000	-	100
Travel IADS Staff	15,000	14,999,595	405	15,000,000	-	100
House rent/maint	13,500	13,500,000	-	13,500,000	-	100
Handling cost	42,000	-	-	-	42,000,000	-
Auto Service	5,850	5,841,640	-	5,841,640	8,360	99
Sub-Total	82,949	40,925,235	405	40,925,640	42,023,360	49
DIP Budget 1984-85						
Local Employees	4,424,000	-	1,092,000	1,092,000	3,332,000	25
Office Expense	1,200,000	-	70,500	70,500	1,129,500	6
Travel IADS Staff	19,280,000	-	3,724,250	3,724,250	15,555,750	20
Exit permit etc.	1,000,000	-	217,000	217,000	783,000	22
Sub-Total	25,904,000	-	5,103,750	5,103,750	20,800,000	20
T O T A L	217,783	149,238,045.50	5,104,155	154,342,200.50	63,440,799.50	70

APPENDIX 1

TENTATIVE AGENDA

FOR THE

SARP FIRST SEMESTER 1984 MEETING

SUKARAMI

SEPTEMBER 13-14,1984

SEPT.12 : Arrival in Padang/Sukarami

13 : SUKARAMI

1. Approval of the Minutes of the Previous Meeting on March 23-24,1984. ASK
2. First Quarterly Report 1984: Matters arising ASK
3. Second Quarterly Report 1984: ASK
   a. Research Highlights (Zainal Lamid)
   b. Manpower Developments (PSS)
   c. Facilities Development (JDT)
   d. Linkages/Extension (ASK)
   e. Technical Assistance (PPA)
   f. Finance (PSS)
4. Communications ... ... ASK
5. Status of Construction ... ... Suntana
6. Status of Procurement ... ... JDT
7. Other Matters ... ... ASK
8. Next Meeting - Dates & Venue ... ASK
9. Tour of New Office/Lab Facilities ... ASK

SEPT.14 : Field Tour to Sitiung.

4'

Balittan – Sukarami
P.O. Box 34 Padang
West Sumatra, Indonesia

Balai Penelitian Tanaman Pangan Sukarami
Sukarami Research Institute For Food Crops (Sarif)

M I N U T E S O F

SARIF SEMI - ANNUAL MEETING

**

S U K A R A M I

MARCH 23-24, 1984

Project No. 497 - 0263

(USAID Loan No.497-T-048)

SARIF SEMI-ANNUAL MEETING -- SUKARAMI
MARCH 23-24, 1984

Attendance:

1.	Dr B.H. Siwi	....	Puslitbangtan(CRIFC), Bogor
2.	Mr Anwar Said	....	" " "
3.	Mr Djam'an	....	" " "
4.	Mr Wikarna	....	" " "
5.	Mr D.E. Sianturi	....	" " "
6.	Dr William P. Fuller	....	USAID - Jakarta
7.	Mr K.A. Prussner	....	" "
8.	Mr A.R. Hurdus	....	" "
9.	Mr J. Sperling	....	" "
10.	Mr Suntana	....	TEAM-4, Jakarta
11.	Mr Harry Irwardi	....	" , Padang
12.	Dr A. Syarifuddin K.	....	SARIF - Sukarami
13.	Mr Harmel	....	" "
14.	Mr Azran Tanjung	....	" "
15.	Mr Adly Yusuf	....	" "
16.	Mr Ketut Tastra	....	" "
17.	Mrs. D. Syarifuddin	....	" "
18.	Mr Syahrial Alimin	....	" "
19.	Mr Syafnuddin Ibka	....	" "
20.	Dr K.O. Rachie	....	SARIF/IADS - Sukarami
21.	Mr J.D. Traywick	....	" "
22.	Dr A. Jugsujinda	....	" "
23.	Mr P.S. Srinivasan	....	" "

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MEETING: FRIDAY, MARCH 23, 1984

Introductory Remarks:

First semi-annual meeting for the year 1984 was held at the headquarters of SARIF, Sukarami, March 23-24,1984, to review the quarterly reports for the period: July-September and October-December,1983, and to discuss other related matters of the Project.

Dr Syarifuddin welcomed all the participants attending the semi-annual meeting, particularly the four-member team from USAID-Jakarta led by Dr William Fuller. In view of the two important national-level meetings held here in Sukarami during February/March,1984, he regretted that it was not possible to hold this semi-annual meeting much earlier. It is heartening to note that this is the first SARP semi-annual meeting held at the newly-constructed guest house of the SARIF headquarters in Sukarami.

Dr Siwi, Director-CRIFC chaired the session.

Minutes of the present meeting are summarized below.

1. Approval of Minutes of the Second Semi-Annual Meeting held in Puslitbangtan, Bogor, August 3-4, 1983.

With the concurrence of all participants, minutes of the second semi-annual meeting for 1983 was approved by the Chairman.

2. The SARIF Third Quarterly Report - 1983.

There was no comment on the SARIF third quarterly report - July-September, 1983.

3. The SARIF Fourth Quarterly Report - 1983.

3.1. Research Highlights. In the absence of Mr Zainal Lamid, who is undergoing English language training in NAR-II, Bogor, Dr Syarifuddin presented the salient features of the experimental results for the second semester, July-December, 1983. His report was augmented by Dr Aroon J. and Mr Ketut Tastra which are summarized below.

Dr Syarifuddin stated that the significant results of the activities during the second semester are highlighted in (a) Agro-Economic Studies; (b) Maturing Technologies; and (c) Program Advances. He briefly explained salient features of these three relevant topics.

Agro-Economic Studies: In West Sumatra, the use of small scale mechanical equipment for farm operations is beginning to increase. With the collaboration of IRRI's agricultural engineering program in West Sumatra, the use of mechanical threshers and small tillers are showing profitable returns, and some farmers are loaning their machines, especially threshers on custom-hiring basis.

Farmers growing corn under upland conditions in North Sumatra are realizing average yields of 3 tons/ha with high levels of fertilizers and other inputs. The availability of seed is the major constraint in increasing the area of production for palawija crops.

Mr Alan Hurdus wanted to know how palawija seeds are distributed. He pointed out that the flow of seeds from one place to another seems to be working satisfactorily in Jawa (Jabal). Dr Rachie said that the problem is particularly

acute for soybean seeds since they remain viable only 2-3 months under ambient conditions in humid-tropics. Even though the farmers are keen to improve soybean production in Sumatra, their major problem is the availability of quality seeds according to Dr Syarifuddin. Moreover, imported seeds are not of good quality. While replying to a query by Mr Hurdus on the status of corn seeds, Dr Syarifuddin said that the quality problem is not acute as compared with soybean. Mr Hurdus mentioned that the availability of chemicals should not be a problem. From his experience, Dr Syarifuddin stated that farmers in Aceh particularly feel that required inputs are often not readily available when needed.

Maturing Technologies: Blast disease and aluminium toxicity are the major constraints in upland rice production in West Sumatra. Inspite of these difficulties, Dr Syarifuddin mentioned that the SARIF has developed several promising breeding lines which are now in final stages of testing. Dr Syarifuddin also stated that upland rice is also attacked by a new disease, brown spot, in some areas, and SARIF will need to work actively on this problem in the future.

In addition to Batang Agam, a cold-tolerant rice variety released last year by SARIF, two more new promising lines are likely to be released during 1984. Dr Syarifuddin feels that these two new cold tolerant rice varieties will prove better than Batang Agam because of their resistance to blast disease. Mr Harmel added that these two new lines are being tested at 15 locations but their performance has not been assessed.

Dr Fuller inquired about the procedures for releasing seeds to the farmers. Dr Syarifuddin informed him that the promising lines are tested in experiment stations and on farmers' fields and then distributed to seed-growers for bulk seed production. With regard to seed production, Dr Siwi explained that seed multiplication centers are established in several provinces under the National Seeds Corporation and the certified seeds are distributed to the farmers. In addition, some progressive farmers are also encouraged to produce seeds for distribution. Dr Syarifuddin pointed out that Aceh will become the major production center for soybeans in view of the suitable soil-climatic conditions prevailing there.

Mr Hurdus asked about the usage of herbicides under zero-tillage cultivation. Dr Syarifuddin replied that SARIF has conducted an experiment with the use of Grammoxone and the yield difference is very low, but it is also toxic. He said that Mr Zainal Lamid is working with different herbicides, and found that Lasso seems to be effective for post-planting and pre-emergence soybeans. Dr Siwi observed that weeds increase rapidly in minimum tillage soybeans, especially after rice. In Aceh, mulching has increased yield levels and reduced weeds, but zero-tillage needs to be studied where there is a problem of weeds.

Even though wheat is not the major concern of SARIF, Dr Syarifuddin stated that one of the SARIF staff doing his Ph.D. at UPLB-Philippines conducted his thesis studies on this crop grown at different elevations in West Sumatra.

Two experimental results at Sukarami seem to be encouraging and better than at the other sites. Mr Prussner inquired whether wheat might be used as palawija crop on a national scale. Dr Syarifuddin replied that it is planted mainly to increase awareness and interest of the nearby farmers. Dr Siwi explained that this study is now in a preliminary stage, and collaboration with CIMMYT is being sought for conducting trials at suitable sites.

Dr Syarifuddin then explained the steps taken by the extension staff to control the brown planthopper in the farmer's fields. Apparently, this pest will need to be controlled on a community basis on account of it's high mobility.

Dr Aroon briefly summarized the different agronomic experiments including the INSFFER trials being conducted in collaboration with IRRI.

Dr Rachie mentioned that plastic covering on chillies grown on high ridges appears useful as it prevents the spreading of diseases and other problems. This practice developed at SARIF may allow farmers to grow chillies during off-season.

Mr Ketut Tastra described some important aspects of cropping systems in Sumatra and stressed that the combined use of livestock, fisheries, and tree-crops is the best approach to increasing farmer's productivities and income.

Dr Syarifuddin emphasized that the future goal of cropping system research will be to integrate all aspects of production including the availability of suitable varieties

fertilizers, insecticides, pesticides and other inputs thereby allowing farmers to grow crops throughout the year and increase their incomes to about US$2500 per family farm.

Dr Sisi urged SARIF to publish it's results in scientific journals within the country and abroad. He also stressed the importance of including these papers as soon as possible, and mentioned that AARD is now seeking articles for publishing in their Crop Science Journal to be printed in June, 1984. Dr Syarifuddin said that SARIF has already published three issues of the SARIF Journal, "Pemberitaan Penelitian Sukarami" containing research articles in both English and bahasa Indonesia. At present he has received more than 20 articles being processed for editing and publishing. He also stated that SARIF would certainly like to utilize the services of the Editor/Information Officer and other senior scientists available at CRIFC-Bogor for their guidance and help in publishing scientific articles.

Dr Fuller was anxious to know how experimental results are being communicated to extension workers and farmers. Dr Syarifuddin replied that packages of practices based on experimental results are periodically discussed at regional meetings arranged by the Department of Agriculture and Extension Directorates and that farmers are being informed regularly of latest developments through field-day demonstrations and radio broadcasts.

3.2 Manpower Resources and Staff Development.

Mr Srinivasan presented the report on manpower resources and staff development. SARIF's total staff as of December 31, 1983 is 475 which includes 218 regular and 257 temporary staff. Seventeen SARIF staff are continuing their studies for the M.Sc.(12 in Indonesia, 3 at UPLB-Philippines, and 2 in the USA); and 7 are working on their Ph.D.s (4 in Indonesia; and 3 at UPLB). Eleven SARIF staff have completed short-term training (non-degree research and in-service training) at different international agricultural research centers. A detailed list of all training courses offered to SARIF staff from the beginning of the project is summarized in Appendix III of the 1983 second semester report presented to the present meeting. Dr Syarifuddin announced that one of the Ph.D. candidates in UPLB, Mr Rasyidin Azwar, has successfully completed his doctorate degree requirements and will return to Sukarami the end of April,1984.

Dr Rachie mentioned that the three-long term trainees under USAID-Loan Funds in UPLB-Philippines presently doing their Master's degree will be transferred to NAR-II/AARD effective from April 1,1984. In addition, two more Master's candidates were processed by SARP for admittance to Sam Houston State University (Texas,USA), and then transferred to the NAR-II project (Fall Semester,1983).

Dr Syarifuddin mentioned that Mr Made Oka, MS candidate at UPLB has been accepted for the Ph.D. program at the same university during this year. He also informed the meeting that Andalas University is initiating a new program of graduate

courses beginning in September,1984. He had also discussed with the concerned officials on the Committee of Manpower Development (LITBANG and NAR-II) about the possibility of getting slots for Master's degree training at Andalas University for SARIF staff.

Replying to a query from Dr Fuller concerning the future plan for staff training, Dr Syarifuddin mentioned that the present target is greater than originally planned. The present plan is to develop at least 16 Ph.D.s and 50 M.Sc.s or somewhat more than initially proposed in the project paper.

Dr Fuller then asked about training offered at SARIF, especially for those candidates returning from overseas long-term training. Dr Syarifuddin replied that there are two types of training -- one is short-term training in international research centers like IRRI, ICRISAT, AVRDC and IITA. This short-term training focusses both on research planning and execution. There is also special overall research management training offered to middle and senior level staff at LITBANG that provides exposure to in-country situations. In addition, SARIF conducts a series of research planning meetings on relevant topics at periodical intervals, such as planning of experiments on different crops, presentation of results, conducting seminars, and participation in budgetary/administrative matters. These brain-storming sessions provide opportunities for all researchers to improve their independent decision making abilities.

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In addition to the above kinds of orientation/training, Dr Syarifuddin mentioned that the expatriate staff also work closely with their respective counterparts. Furthermore, SARIF is interacting closely with the University Professors at Andalas University in Padang and with the national commodity coordinators like Dr Harahap on rice and Dr Sujadi on soils.

Finally, Dr Fuller stressed the importance of the involvement and interaction of social scientists in the Project.

3.3 Facilities Development.

Mr Traywick briefly reviewed the situation at the end of 1983. The original schedule of the construction was to be completed by the end of 1983. However, the changes in GOI regulations, rupiah devaluation, sharp escalation of construction costs and building materials, budget curtailment, and other problems have combined to delay considerably. It is hoped that the original goals of the project will be achieved within the two-year extension period of the Project.

Station Development.

1. Pasar Miring. About 90% of construction and other facilities have been completed.
2. Sukarami. Phase IIA - Office/Laboratory buildings will be ready for occupation by the end of April,1984.

   Phase III - Guest House/Cafeteria complex has almost been completed, and final inspection is scheduled by end of April,1984.
3. Sitiung. Phase I - Roads, houses,etc., are behind schedule. Completion and final insepction are anticipated in the near future.

Mr Traywick also mentioned that the SARIF headquarters was moved to Sukarami last October, and water and electrical seem to be functioning satisfactorily. Most of the first order -- tractors, generators, field equipment, workshop tools, and other items have all been received. Then, on February 23 to March 8,1984, a training course on the assembly, maintenance and field operation of tractors and farm machinery was organized at Sukarami for 18 operators/mechanics from all SARIF stations. Service facilities for the equipment will be completed fairly soon. A short-term consultant on agricultural engineering and a VSO mechanic are expected during May/June at Sukarami to assist with station development and maintenance/operation of tractors and field machinery.

In view of the budgetary curtailment, Dr Fuller wanted to know whether the GOI contribution for construction will be reduced. Dr Syarifuddin indicated that the budgetary proposal has already been submitted to LITBANG, but no definite information is available regarding the DIP allocation. However, sufficient funds are already earmarked for completion of existing construction work and for furnishing the new buildings. Additional top-level meetings are planned in an effort to clarify commitments on GOI contributions.

It was decided to discuss 'Procurement' again and in greater detail at the end of the meeting, since Mr Suntana of TEAM-IV wanted to present his report before leaving Sukarami same day (Friday, March 23,'84).

3.4 Linkages/Extension.

Dr Syarifuddin presented the report on the Linkages/Extension activities of SARIF. He pointed out that the Director and staff of SARIF are regularly participating in monthly technical meetings with officials in North Sumatra, Riau, Jambi; and they plan to meet again next month in South Sumatra.

Dr Syarifuddin summarized the activities regarding the wheat field day, special visit of the Secretary-General of Food Crops to Sitiung, and the major technical advances made by SARIF during the second semester.

Dr Syarifuddin also agreed to the suggestion made by Dr Siwi for training extension workers in Sukarami, but he felt that the budgetary constraint may be the limiting factor.

Dr Fuller inquired whether the private sector is involved in the distribution of seeds for palawija crops. Dr Syarifuddin replied that so far no representatives of private sector are involved in seed production and distribution excepting an EEC group in Jambi and the tapioca factories which depend on the continuous supply of cassava from the nearby farmers.

Dr Fuller inquired whether farmers are encouraged to produce seeds, and Dr Siwi suggested that concerned agencies should contact the farmers and teach them how to produce good quality seeds. State seed certification agencies should also monitor production and certify the seeds produced by farmers before distribution. Moreover, a special incentive in the form of a bonus should be paid to farmers for producing quality seeds, according to Dr Siwi.

3.5 Technical Assistance.

Dr Rachie reported briefly on the activities of the five resident specialists (also summarized in the report).

Dr Rachie also used the opportunity to inform the group that he will complete his two-year assignment in early June, 1984; but stressed that steps are being taken to identify a suitable replacement. In the meantime, Mr Traywick will act as Project Specialist.

Dr Syarifuddin added that the replacement for the Project Specialist should be made immediately. He is fully satisfied with the biodata of Dr Pierre Antoine submitted by IADS; however, he would like to have him visit SARIF/CRIFC before confirming his appointment. Mr Hurdus pointed out that the interview trips are no longer allowed since USAID auditors have already objected to this type of travel.

Dr Fuller concurred on the importance of the full team of technical assistance to the Project. Therefore, he would also like to have the replacement for the Project Specialist as quickly as possible. He suggested that Dr Antoine could visit Indonesia (CRIFC/SARIF) as an IADS HQ staff on an inspection/supervisory visit, since there is a provision in the contract for this type of visit to the Project. Mr John Sperling also endorsed this suggestion.

Dr Siwi mentioned that both Drs McClung and Athwal discussed the replacement for the Project Specialist with him and he would take up the matter with Mr Sadikin as soon as possible.

Dr Rachie observed that the Agricultural Economist, Dr Perry, is also planning to terminate his assignment this year. He would like to plan on home leave during July/August to settle his family in the US, and then return to post to complete his assignment by early November. Since the contract does not permit termination within 3-months after returning from home-leave, USAID (Sperling, Hurdus, and others) suggested that Perry should consider accompanying his family on vacation at his personal expense or extend his stay (without home leave) until September or October. However, these options will need to be discussed with Perry later.

3.6 Finance.

Mr Srinivasan briefly presented the financial report for the second semester. There were no comments on the report.

6. Status of Construction.

Mr Suntana of TEAM-IV summarized activities regarding construction work underway, and gave copies of a newly-revised proposed schedule for completing all remaining projects. New schedule was approved.

Sukarami II-A. Almost completed. There will be a two-months maintenance period upon completion of all construction work, and USAID could then inspect all the jobs completed.

Sitiung I. According to last report, it has already been finished, and a final inspection will be made next week.

Sukarami III. Since the building has been used several times, it is very difficult to complete construction work. Hopefully, the contractor could undertake all repair jobs to complete the guest house by the end of March, 1984.

Kayu Agung Phase I. Contracting and construction work will begin during the next few months and will be completed by May/June, 1985.

Mr Alan Hurdus indicated that GOI has reduced its contribution on station development to 200 million rupiahs towards fees for supervision, designing, and other services for fiscal year 1984/85. However, he pointed out that the USAID would still like to help supervise the construction work as well as help select the official inspector/supervisor company.

Dr Syarifuddin also urged the USAID to arrange for intensive supervision of the construction work, since no other competent person excepting Mr Traywick is available in the Project.

Mr Traywick stressed the urgency of strict adherence to all aspects of schedules as it will not be possible to meet the completion deadlines without close cooperation of all concerned. Dr Syarifuddin therefore suggested that an early coordinating meeting be held to resolve problems and bottlenecks. Mr Suntana proposed that these meetings could be held in Bogor or Jakarta and strongly stressed the necessity of making key decisions. He also urged that the cost estimates for 1984/85 projects need to be approved in advance by USAID before initiating any discussions in the coordinating meetings. Mr Hurdus agreed to assist on the approval of cost estimates sometime during the following week. Mr Suntana also proposed that plans and tendering documents could be completed for all remaining projects, presented to USAID for checking and approval.

With regard to farm development, land clearing, and fencing at all locations, Mr Suntana wanted to include the architect's fees in the tendering document and the same amount could then be paid to TEAM-IV by the successful bidder. Pak Djam'an explained that resolving this issue was difficult as he has discussed it with the officials in BAPPANAS, Public Works, Ministry of Finance in Jakarta and Padang, and the interpretations vary from one to another. Dr Syarifuddin suggested that the design fee should be included in the future DIP budget. Both Mr Hurdus and Mr Sperling stressed that the availability of GOI funds should be spelt out specifically for construction, station development and other line items.

Dr Fuller suggested the following three alternatives on allocating funds for construction and station development: (i) Adjust the DIP as per the targets of the Project; (ii) Continue to negotiate with the officials concerned in BAPPANAS and other high-level officials to reallocate the funds required to the Project; (iii) Reallocate dollar funds within the existing budget. Dr Fuller readily agreed to help in discussing this matter with senior level officials at any time and to strongly support the project requirements.

Dr Rachie requested clarification on what changes in the extension propos l and contract amendment would be required if budgetary schedules are to be changed. At this juncture, the status of SARP extension was discussed. Pak Djam'an pointed out that the official response from USAID to AARD regarding extension of the project is still

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awaited, and Mr Hurdus informed that the relevant letter is being sent to AARD.

Dr Fuller did not see any reason to delay in communicating USAID's concurrence to AARD on the extension of the project for two years, and asked his colleague Mr Sperling to arrange for issuing the necessary PIL (Project Implementation Letter). However, the reduced DIP budget for construction is unacceptable to USAID. Until the GOI shortfall in Rupiah funds is restored to the Project, the USAID will have no choice except to modify its own commitment through an appropriate communication to the GOI, according to Dr Fuller.

Meeting adjourned for the day at 6:00 PM.

SATURDAY, MARCH 24,1984

Status of Procurement

Mr Traywick reported on the status of procurement. So far three different equipment orders have been prepared:

First Order. A shipment including all items in the order such as tractors, field equipment, workshop equipment and electrical generators have all arrived and are being inventoried. The 13 large 4-wheel and 20 2-wheel tractors have all been assembled at Sukarami, and a short-term training course for 18 operators/mechanics from eight stations was completed (February 13 to March 8,1984).

Many problems were encountered in obtaining shipping documents and clearing through Customs. Transhipment of the items through Singapore has also caused considerable inconvenience, some damage and pilferage. Nearly Rp.800,000 has been spent on the purchase of bolts and nuts and other items for assembling tractors and other field equipment. It was therefore decided to request Trans-Century to pack all future shipments in special wooden crates, attach packing lists (both inside and outside the box), and consign the shipment directly to Padang via Singapore.

Second Order. Considerable time was required to obtain the LC (Letter of Credit) Number. In the meantime, some items from the Philippines have already arrived at the Padang dock, and should be cleared as soon as possible.

Most of the second order consists of laboratory equipment, some field machinery, and other items for the cafetaria.

Third Order. This order was prepared several months ago for processing through Trans-Century with whome a contract was also signed. Most of the items in the third order relate to seed storage, office and laboratory equipment.

As a consequence of GOI regulations on procurement which must normally be channelled through SEKNEK, formal approval for all items included in the third order has not yet been obtained. SEKNEK insists on procuring those items that are locally available or manufactured. This poses a serious problem since the procedure deviates from US government regulations.

After series of meetings with officials concerned in BAPPANAS/SEKNEK, Mr Hurdus suggested the following:

(a) Finalize the list of items to be procured from abroad and locally.

(b) Tendering should be arranged for all goods from the US and those to be procured locally.

(c) The LC number should be obtained for all items to be procured from abroad.

(d) Trans-Century will evaluate competetive bids -- partly from Indonesia and partly from the US.

(e) PT Dharma Niaga will continue to work on the Third Order.

(f) The local representative of Trans-Century will coordinate with their headquarters in the US for expediting documents required.

Pak Djam'an explained the situation on procurement. The surveyor's report on losses and damage for the first shipment is expected to be submitted shortly, and an insurance claim for Rp.800,000 will be made by PT Dharma Niaga for direct reimbursement to SARIF.

He also mentioned that the LC has already been opened for the second order, and Trans-Century has been so informed. After collecting all necessary materials, Trans-Century should send the original copies of the Bill of Lading, packing lists, invoices, and other documents directly to their representative in Jakarta who in turn should hand-deliver them to PT Dharma Niaga for completing Customs formalities. Also, Trans-Century has been specifically

informed that all items included in the second order should be packed in export boxes and sent directly to Padang and not to Singapore, according to Pak Djam'an.

In order to expedite shipment documents, customs clearance and transportation, Pak Djam'an proposed that all concerned should meet at least once a month in Jakarta/ Bogor to resolve the problems.

With regard to the problem on the finalization of the Third Order, Pak Djam'an said that it needs to be discussed with the officials concerned in BAPPANAS/SEKNEK. Dr Syarifuddin also agreed to this suggestion.

A query was raised by Mr Sperling on the difference between items procured from the local distributor and direct purchase since the CIF cost needs to be added to direct procurement from the US. Dr Syarifuddin replied that it will still be cheaper to buy from the US in view of tax exemption.

Dr Rachie suggested that the entire Third Order be reviewed to determine which items could not be obtained locally so that these could be procured immediately from the US.

Dr Syarifuddin indicated that the services of a PSA were found superior to using international tendering which requires more than two years for processing. Mr Hurdus said that senior officials in SEKNEK/BAPPANAS also concur with the use of PSA since there are considerable savings in time and money.

After some discussion, it was decided to meet (ASK, JDT, Djam'an, ARH, et.al.) with the officials in SEKNEK on APRIL 9, 1984 to resolve problems on the Third Order procurement.

Next Meeting: It was decided to hold the next semi-annual meeting on SEPTEMBER 11-12,1984 either at Gurgur (North Sumatra) or at a site near Bogor.

Other Matters:

Dr Syarifuddin reported that the communication facilities at SARIF headquarters in Sukarami will be established within two months. Funds allocated (Rp. 60 million) for telephone connexions will also cover a telex installation (both national and international).

Mr Hurdus mentioned that reimbursement for micro-computer/word processor purchased by IADS/SARP will be arranged fairly soon - "within two weeks".

Mr Hurdus inquired about the possibility of loaning one of the large Ford tractors for use in Kalimantan to allow Mr Harwood to initiate some station development there. Mr Traywick said that it may not be possible to use SARIF's tractors as they are not large enough for the purpose intended. Moreover, transport to Kalimantan would involve unimaginable problems.

At the conclusion of the semi-annual meeting, Dr Fuller expressed his satisfaction and sincere appreciation for the rapid progress made in all aspects of the Project. He was particularly impressed by the dynamic

leadership and active participation of all concerned. He was very happy to see the SAR Project is receiving excellent support from Dr Siwi and has a strong technical assistance component.

Dr Siwi acknowledged Dr Fuller's sentiments and expressed appreciation for USAID's active support and cooperation on the SAR Project.

On behalf of IADS/SARP group, Dr Rachie conveyed his appreciation for the excellent cooperation and support received throughout his period of association with the SARIF. He was very pleased with the highly capable leadership in the Project; the excellent cooperation and dedicated efforts of SARP colleagues; and the impressive progress made during the past two years.

Meeting adjourned at 9:30 AM.

A brief tour of the newly-constructed office-laboratory complex and new equipment was arranged by Dr Syarifuddin to all participants attending the semi-annual meeting.

Minutes recorded by: P.S. Srinivasan

APPENDIX 3

THE CHALLENGE OF THE MANAGEMENT OF SOILS FOR FOOD CROP PRODUCTION IN THE NEWLY OPENED TRANSMIGRATION AREA OF SITIUNG IN CENTRAL SUMATRA. POTENTIAL NEW ORIENTATIONS FOR RESEARCH.

Aroon Jugsujinda and Pierre P.Antoine.

ABSTRACT

The newly opened transmigration area of Sitiung is located in the peneplains. Soils found in this landform belong mainly to the orders of Oxisols, Ultisols (and eventually Spodosols). Major problems associated with these tropical soils are the low pH, the low cation exchange capacity, the low level of total and available nutrients, the very low base saturation percentages, the high to very high aluminum saturation percentages, the high phosphate fixation capacity, a clay fraction consisting of surface inactive minerals (kaolinite, quartz, aluminum oxides, etc.), a very low level of microbiological activity, especially in the subsoil, the high sensitivity to compaction (especially the ultisols) with a very slow recovery from it and a low water and nutrient retention.

Given the above constraints, the overall natural fertility status of these soils is very low and depends mostly on soil organic matter, a soil component which is itself very unstable. Aluminum content and, in some places, manganese content can be very high, causing toxicity for plant growth in upland conditions. On the other hand, iron toxicity and other plant nutrients deficiencies are observed in lowland rice, in the newly opened areas.

Improvement of physical and chemical properties and the addition of organic matter are very important for a sustained agricultural system. For aerable crops especially, liming (supply of Ca and Mg) and balanced fertilization practices are required to maintain soil productivity at acceptable levels. To obtain sustained good crop yields, special attention must be paid to various techniques of soil and water management. Among the most promising techniques, one can cite no-till farming, mulching, alley cropping of regenerative crops (to recycle nutrients), application of proper and balanced plant nutrients, suitable cropping systems to maintain soil cover all year round, and finally, adoption of high yielding and short growing period varieties adspted to the adverse soil conditions. However, the frequently difficult access to inputs and the variable output prices require a global research approach to the technical innovative packages.

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Introduction

Sumatra island has been divided into 7 major production zones (Scholz, 1983). They are the western coastal strip, the mountain zone, the piedmont zone, the peneplains, the eastern lowlands, the western island chain and the eastern islands. The peneplains are approximately 1000 km long and 100 km wide and have good potential land for agricultural development.

The Sitiung transmigration area is located in the peneplains. Soil survey reports (SRI, 1979) show that the soils found in this landform developed primarily from tertiary river terrace alluvium, in some places mixed with acid volcanic tuffs. The relief is undulating with convex to slightly flat ridge crest, concave lower slopes and wide valley floors.

Since Scholz (1983), among others, listed the soils as the major constraint to crop production in the peneplain area, the following pages will attempt to focus on the critical relationship between soil properties, soil management practices and food crop production.

A. The Soils

1. Classification of Soils. The major soils found in the peneplains are, according to the Indonesian System of Soil Classification (SRI), Podzolic and Gley soils, and Latosols.

Podzolic soils occur in undulating peneplains. They are not covered by the volcanic products and are mostly represented by the chromic Podzolic soils (Yellowish Brown Podzolic soils) or Orthoxic Tropudults (USDA, 1975).

Latosols occur very extensively on undulating to rolling areas. They developed from acid volcanic tuffs. The U.S. Soil Taxonomy (1975) classifies them as Typic Haplothox and Tropeptic Haplorthox.

Gley soils are found in the poorly to very poorly drained depressions and valley floors, characterized by gley horizons due to stagnant water or high ground water table. They are generally associated with acid Red Yellow Podzolic soils. They are classified as Gley Soils (SRI) or Aeric Tropaquults (USDA).

2. Fertility of Soils. The evaluation of the soil fertility status is based on the chemical data of the top soil samples (less than 30 cm). A separate report will show the chemical data of selected profiles of the three great soil groups found in the peneplains area. From the fertility standpoint, most soils are very poor and have high concentrations of aluminum (Al-saturation is more than 70%). Manganese content can also be high. The essential plant nutrients such as N, P, K, Ca and Mg are extremely low. Thus there is an imbalance of nutrients between macro-and micro- elements. These conditions can be detrimental to most crops grown in this area.

3. Soil Fertility Improvement

3.1. Organic Matter

The natural soil fertility depends mostly on the organic matter of the topsoil; it is very unstable and will decrease rapidly after cultivation. Intensive and continuous cultivation without any measure of improvement such as organic matter recycling and monitoring of soil fertility, will deplete the soil

nutrient contents, because the biological recycling is cut off.

3.2 Liming

Most of these soils can be readily improved by liming and fertilization and become quite productive for any climatically adapted crop. Liming, however, must be very carefully monitored, as stated by Spain et al (1975), because a tropical allic soil environment (where Al is the dominant exchangeable cation) is extremely sensitive to overliming. It should be emphasized therefore that the application of lime is to supply Ca and Mg as nutrients in the soils rather than to neutralize soil acidity or exchangeable aluminum, so that the lime requirement can be minimized.

In some cases, the calcium present in the phosphorus fertilizers may be sufficient to meet the nutrient requirements of many crops which are less demanding in calcium. It is expected, however, that the crop yield will be lower than if complete liming is given. At the present time, however, since the cost of fertilizers and lime at the farm level is high and the crop prices are low the inputs are too costly for the farmers. Therefore, it is very important to select plant species/varieties which are better adapted to the adverse soils conditions and require a minimum to medium cost input.

3.3. Phosphate Fertilizer

Phosphorus is also low to very low in most of these soils. Therefore, basic phosphorus fertilizers seem to be essential, especially for upland (arable) crops. Furthermore, phosphorus applied as fertilizers will be fixed by aluminum. As stated by

Kamprath (1972), Al saturation greater than 60% will cause phosphorus applied as fertilizers to be readily fixed unless lime is also applied.

4. Soil Redox Chemistry

Submerged conditions also create some problems. A number of physiological diseases of rice are associated with oxidation - reduction (redox or Eh) conditions.

4.1. Sulphide toxicity

Of particular interest are the sulphates. Sulphates undergo reduction at low negative Eh values and the ultimate product of this process is sulphides, an extremely toxic anion. In most soils, toxicity is prevented by precipitation of FeS (Tanaka and Yoshida, 1970; Engler and Patrick, 1975; Ponnumperuma, 1976), but if there is not enough active iron in the soils, sulphides will accumulate and may hinder nutrient uptake by rice root or even poison the plants. It may also lower the availability of Cu and Zn (Jugsujinda and Patrick, 1977).

Soils in the Sitiung area are high in sulphates and low in iron. The cation exchange capacity and the base saturation are very low. Therefore, submergence/flooding (as in flooded rice in newly opened area) can cause sulphide toxicities.

4.2. Iron toxicity

On the other hand, according to Ponnamperuma (1975), iron (Fe) coming into solution as Fe^{2+} will increase with time, and in strongly acid Ultisols and Oxisols, this Fe^{2+} formation will reach a concentration of more than 300 ppm during a few weeks of submergence. Iron toxicity is recognized as one factor which

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limits the yield of rice on strongly acid Oxisols, Ultisols and Acid Sulphate soils in the tropics.

According to Ishizuka (1975), rice plants in the newly claimed paddy fields often suffer from the toxic effect of excessive iron, manganese and copper. However, after several years of continuous paddy cultivation, the elements which become soluble under reduced conditions will be leached downward by the movement of irrigation water. And after a certain period, there may be a deficiency of those elements in the topsoil, especially under conditions of excessive drainage. Soil and water management must be carried out properly. Therefore, it is essential that the drainage of paddy field be maintained under optimum conditions, and the soils be intermittently aerated during the period while the crop is being cultivated. These may be the situation that have occured in wetland (flooded) rice trials of Balittan-Sukarami Food Crop Research group in the Sitiung I Blok A. Chemical changes especially, the pH, Eh, sulphides and iron must be monitored in the experimental plots of flooded rice currently under the supervision of the Food Crop Research group.

4.3. Soil Redox Chemistry Research

Patrick et al (1984), however, proposed to SARIF a collaborative project involving Food Crop Research, Soil Research groups and Louisiana State University entitled "Redox chemistry and fertility problems in the wetland soils of the transmigration areas of Sumatra". The first and most important research project will deal with the redox-pH chemistry of upland soils of the Sitiung Transmigration Area that are to be used for both

flooded and upland rice cultivation. Preliminary research shows that rice growing on these soils is subject to nutritional and/or toxicity conditions. The actual cause (s) of this problem is not known at the present time and our cooperative research effort will be directed at determining how much of the problem is due to redox and pH induced toxicity and how much is due to nutrient deficiencies that may be aggravated by toxic soil conditions. The soils in this area are weathered and acid and toxic levels of aluminum, iron and manganese can possibly develop under certain combinations of pH - redox conditions that can occur under both flooded and upland conditions. The toxicity-nutritional problems of the soils in Sitiung Area must be solved before successful growing of rice in this transmigration area can be achieved.

5. Soil Physical Properties in Upland Condition

5.1. Soil Aeration

In general, porosity for available water and aggregate stability of the soils in the Sitiung area are considered as good for upland cultivation, while aeration porosity is insufficient. The low percentage of aeration porosity may become a serious problem, and it becomes worse during the rainy season since the actual air capacity may decrease. It was observed in the upland rice field of the transmigration area, that may spots in concave surface, where the plants showed very poor growth or even died. For such soils, drainage is very important to prevent waterlogging in the rainy season.

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5.2. Soil Compaction

The poorly growing crops were found on the compacted soils. Even cassava, which generally can be considered as the most adaptable crop in the transmigration area, showed very poor growth. The root of cassava could not spread widely. This condition was especially observed in Block E of Sitiung II where the topsoil has been eroded or removed during land clearing operations and, to a certain degree where soil compaction occurred due to the use of heavy machinery.

The most serious effect of the improper mechanical land clearing is the the disappearance of the topsoil, resulting in the exposition of the compacted and infertile subsoil. Some efforts have been done, for example to distribute the gathered topsoils, but it was not sufficient. The application of large quantities of organic and inorganic fertilizers are required. The seriously disturbed land should be planted with green manure crops or tree crops.

5.3. Soil Erosion.

Improper land clearing practices using heavy equipment without due consideration to the slope classes and soil conditions, have caused degradation of the land such as loss of topsoil, soil compaction, severe erosion and marked decrease of soil productivity.

The methods used for the control of soil erosion are well documented. On a gentle slope, contour planting of tree crops should be introduced adjacent to food crops and minimum soil tillage and, if possible, green manure crops should be included

in the cropping system. Continuous crop cover or vegetative cover should be developed. On the steeper slopes, terracing should be developed.

B. Management of "Problem Soils" for food crops

1. "Shifting cultivation" in mulch covered soils.

von Uexkull (1982) suggested low cost management systems for "problem soils" involving crop rotation or "shifting cultivation" on mulches. To maintain soil fertility and good crop growth in a tropical climate, the soil should be covered and moist all year round. Properly established and maintained, a number of creeping leguminous cover crops can take over the role of the natural forest vegetation. Though cover crops have been tried in the past also for annual food crops, the approach used was too heavily influenced by the temperate climate "green manure" concept. In the low pH, low C.E.C. tropical soils, it is most important to keep the topsoil cool, moist and shaded most of the time and therefore the soil must be covered all the time by a living or dead mulch. Von Uexkull method involves 3 steps: land clearing, land preparation, and cropping patterns. Plant or seed cover crop (Psophocarpus palustris, Mucuna coccinicusis, Calopogonium muconoides for seeding, and Pueraria javonica or Calopogonium caeruleum for cuttings). Apply 200-400 kg rock phosphate at the time of cover crop seeding or planting. The land is left for 1-2 years under the cover crop. Once 100% dense leguminous cover has been established, a rotational cropping pattern can be introduced as followings.

1. 10 m wide strips of the cover crop are sprayed out with cheap weedicides (like 2-4 D, Actril, Caramex or Grammoxone, Banvel, etc...).

2. Upland rice, maize and cassava are planted under the mulch covering the soil after spraying out the cover crop. To prevent damping off (Rhizoctonia spp.), the mulch is removed from the planting row if planting is done during the wetter part of the year.

3. Tillage is zero to minimal (shallow furrow in the planting row).

4. Fertilizer application consists of 100 kg rock phosphate and 50 kg KCl/ha/crop (applied after spraying out the cover crop); where available, finely ground dolomitic limestone is applied after each harvest.

5. A good leguminous cover will contain in its litter about 130 - 180 kg N, 8 - 12 kg P, 80 -120 kg K, 15 - 20 kg Mg and 40 - 70 kg Ca/ha.

6. Weeding consists mainly of preventing the cover crop from creeping back into the sprayed out areas and removing grasses (Imperata cylindrica) if they ever appear. Weeding is terminated 2 weeks (rice) to 4 weeks (maize) before harvest to permit the cover crop to come back.

7. Once the cover crop is re-established on the cropped area, new strips of cover crop are sprayed out for cropping. This rotation method of cropping is just like shifting cultivation within the cover crop area. With such system of "shifting cultivation" a farm family could manage a total of 5 ha, consisting of 2.3 ha cash crops (rubber) and 2.5 ha food

crops out of which, in any year, only 1.125 ha would actually be under food crops. The ratio between the area used at any time for food crops and the area under legume fallow can vary from 1:1 to 1:3. Only one food crop is taken, after which legumes are allowed to come back. This is done not only to maintain fertility but also to keep the plots free from grasses.

Research is urgently needed to obtain comprehensive data to substantiate the suggested approach. But from the results of several observation plots there is already some confidence that the approach is practical. However, proposed cooperative research is presently being negotiated with Dr. H.R Von Uexkull.

2.No-till farming systems

Wanigasundara (1983) reported no-till farming systems as a mean of conserving water and soil and of regenerating the soil, besides backache and money. Conventional farming, as we know it, ignores the value of the natural regeneration of the soil by the recycling of plant residues which bring about fertility. Plowing is not only expensive and time and energy consuming, but can also increase soil erosion.

Two systems of no-till farming are being suggested. The first is a basic no-till farming with simple, locally made equipment, but with a continued dependence on small quantities of herbicides. The second, a more radical process, is "avenue cropping" or "alley cropping" and "live mulch cropping", which can eliminate the use of herbicides and chemical fertilizers altogether.

a. The basic no-till farming

From the standpoint of available labor force it is beyond the capacity of one family to cultivate their own land at once prior to a planting season. The farming of one hectare requires about 75 man-days of work (Sitiung farmer survey data January, 1983, Agro-economics group, Balittan). Plowing by tractor is expensive, costing around the equivalent of $ 133 per hectare. Even draft animals plowing costs $113 per hectare. Under the no-till system, however, the farmer does not plow, but lets the land lie as it is with the stubble and mulch of the previous season.

No-till needs two simple pieces of hardware: a weed-killer sprayer, the "CDA" (controlled droplet applicator), which has a long handle and a small, easy to carry drum for herbicide, and an "RIP" (rolling injection planter), - a long handle seeder with one or more injectors for seeds at the end of it.

Most farmers wait for heavy rains to soak their fields before plowing and then planting. But at the first sprinkle of rain, when the soil is barely moist, the non-till farmer sprays his mulch - covered field with small doses of herbicides of low toxicity, at the rate of roughly one kilogram per hectare, about one-twentieth of the usual dose. The herbicide inhibits the growth of weeds, but does not affect the crop.

After about 10 days, the RIP seeder is dragged over the decaying stubble and mulch, injecting the seeds into the soil and automatically covering them. No-till farmers thus avoid the two tasks of plowing and weeding which require an estimated 70% of the time of the conventional farmer. It is estimated that the basic no-till farmer spends between $ 54 to 97 per hectare.

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b. Alley cropping and live mulch cropping.

The biggest source of fertilizer lies in the undergrowth. Trees and plants which complement each other are associated for chemical-free alley cropping and live mulch cropping.

In alley cropping, rows of food crops like upland rice and maize are planted between rows of leguminous trees like lamtoro (Leucaena leucocephala) which fix nitrogen in the soil and recycle nutrients in the soil. With the first rains, the branches are chopped and laid between the avenues of trees. They constitute the mulch and add fertility in the soil. The seeds are then injection planted or dibble planted with wooden stick and left to grow. The chopped lamtoro trees regrow in time for the next season.

Live mulch cropping involves growing a foundation of leguminous plants as undergrowth. These plants are grown thickly to push out the weeds and fix nitrogen in the soil. With the first rains, they are made dormant with a light application of a growth regulating chemical. The food crop seeds are then injection planted. By the time the leguminous "foundation" awakes from its dormancy, the main crop is ready for harvesting. The undercover crop (winged bean, cowpea, etc.) will resume growth and provide the mulch for the next season. Poor countries cannot afford high technology and big doses of chemicals. They must protect and enrich their soil by other methods, such as careful blends of agricultural and forestry/agroforestry practices.

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3. Other soil management practices.

a. Liming. A major problem related to the fertility of tropical oxisols and ultisols (and spodosols) is the low pH. Liming has been suggested as the most promising answer to that problem, but for many reasons, liming in the tropics is still a controversial issue (Pearson, 1975). Liming practices which are successful in temperate areas where 2:1 clays predominates are not applicable to highly weathered soils with 1:1 clay and 2:1 Al-interlayered clays (Kamprath, 1980). The predominant cation in acid tropical soils with a pH of less than 5 is aluminum (Coleman and Thomas, 1967). Very high lime rates are needed to exchange and precipitate aluminum, especially where aluminum-interlayered clays predominate.

Kamprath proposes that as a general formula, the meq KCl-extractable acidity/100 g x 2 will give the require meq CaCo3/100 g in 1 ton of CaCo3/ha. Based on this formula, many soils in Sumatra would require well over 30 tons of lime/ha! Moreover, freed aluminum hydroxides resulting from the increase of soil pH fix phosphorus and other trace elements (boron in particular). Apart from inducing deficiencies or imbalances with other elements, or being ineffective because of inadequate fineness, the high price of lime makes its use often uneconomical. In Indonesia the kilo of lime often is only slightly cheaper than the kilo of triple superphosphate.

Lime application is certainly beyond the reach of the average settler who is supposed to make his living from the "problem soil".

b. Organic matter application

As the yield decline observed in poor tropical upland soils is usually in line with the decline in organic matter, use of organic matter as a means to maintain and to improve soil fertility has often been suggested.

But because of rapid decomposition, the effect of organic matter is short-lived, unless continued application is practiced. The low surface activity clay minerals do not form stable organo-mineral or clay/humus complexes.

c. Inorganic fertilizers

Response to applied chemical fertilizer is often disappointing and fertilizer application is therefore seldom economical. A number of different factors contribute to poor fertilizer response. The most frequent causes are: aluminum toxicity, imbalanced fertilizer use, water or oxygen stress, use of poor cultivars, poor management, poor planting techniques, and weed competition.

As most of the potential new land areas are far from the markets and have poor infrastructure networks, price relations between fertilizer cost and producer price are such that fertilizer use is usually not economical for the low yields and response levels which can be obtained.

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Conclusions.

The soils of the Sitiung transmigration area present obvious challenges to the researcher and to SARIF in particular. Techniques to manage these soils, which are highly susceptible to erosion and degradation, have not beer perfected yet. Moreover, economic considerations like price or access to seemingly necessary inputs render the technical innovations and packages even more difficult to implement and emphasize the need for a global approach to cropping/farming systems research work.

References

1. Coleman, N.T. and Thomas, G.W. 1967. The basic chemistry of soil acidity. In, R.W. Pearson and F. Adams, ed.: Soil acidity and liming. ASA, Madison Univ.

2. Engler, R.M., and W.H. Patrick, Jr. 1975. Stability of sulfides of manganese, iron, zinc, copper, and mercury in flooded and nonflooded soil. Soil Sci. 119:217-221.

3. Ishizuka, Y. 1971. Nutrient deficiencies of crops. ASPAC, Taipei, Taiwan.

4. Jugsujinda, A. and W.H. Patrick, Jr. 1977. Growth and nutrient uptake by rice in a flooded soil under controlled Aerobic - Anaerobic and pH conditions. Agron. J. vol. 69:705-710.

5. Kamprath, E.: 1972. Soil acidity and liming. In: US Nat. Res. Council: Soils of the humid tropics. National Acad. of Sci., Washington D.C., 136-149.

6. Kamprath, E. 1980. Soil acidity in well-drained soils of the tropics as a constraint to food production. In, Priorities for Alleviating Soil-Related Constraints to Food Production in the

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Tropics. IRRI, Los Banos, Philippines, 171-187.

7. Patrick, W.H., Jr.; Robert P. Gambrell; A. Syarifuddin K.; Aroon Jugsujinda; D.A. Muljadi; and M. Sudjadi: 1984 Redox chemistry and fertility problems in the wetland soils of the transmigration areas of Sumatra; A Project for Cooperative Research, Graduate Education and Scientific Staff Exchange. Submitted to and Approved by USAID and AARD May 5, 1984.

8. Pearson, R.W. 1975. soil acidity and liming in the humid tropics. Cornell Int. Agric. Bull. 30. Cornell Univ. N.Y.

9. Ponnamperuma F.N. 1975. Micro nutrients limitations in tropical acid rice soils. In. the Soil Management in Tropical America. pp. 330-345. N. Carolina State University, U.S.A.

10. Scholz, U. 1983. The Natural Regions of Sumatra and Their Agricultural Production Pattern, A Regional Analysis volume 1. Ministry of Agriculture, Republic of Indonesia, Agency for Agricultural Research and development, Central Research Institute for Food Crops (CRIFC).

11. Spain, J.P.; C.A. Francis; R.H. Hoovler and F. Calvo. 1975. Differential species and varietal tolerance to soil acidity. In. the Soil Management in Tropical America, pp. 308-329, N. Carolina State University, U.S.A.

12. SRI 1979. Soil survey of the irrigation project area, Sitiung - S. Jujuhan (West Sumatra). Ministry of Agriculture, Agency for Agricultural Research and Development, Soil Research Institute.

13. Tanaka, A., and S.Yoshida. 1970. Nutrition disorders of the rice plant in Asia. IRRI Tech. Bull. 10:1-47.

14. von Uexkull, H.R. 1982. Suggestions for the management of "Problem Soils" for food crops in the humid tropics. Tropical Agriculture Research Series No. 15. Tropical Agriculture Rebsearch Center. Ministry of Agriculture, Forestry and Fisheries, Yatabe, Tsukuba, Ibaraki 305, Japan.

15. Wanigasundara 1983. No-till farming: less work, expense. The Jakarta Post, Monday November 7, 1983.

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