

LAM NAM OON INTEGRATED RURAL DEVELOPMENT PROJECT

QUARTERLY REPORT

November 1979 - January 1980



Contract Between
MINISTRY OF AGRICULTURE AND COOPERATIVES
of the
KINGDOM OF THAILAND
and
LOUIS BERGER INTERNATIONAL, INC.
of
THE UNITED STATES OF AMERICA
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February 12, 1980

Khun Roongrueng Chulajata
Project Field Director
Lam Nam Oon Integrated
Rural Development Project
Amphur Phang Khone
Sakon Nakhon

LETTER OF TRANSMITTAL

Dear Khun Roongrueng:

We are pleased to submit herewith ten (10) copies of the First Quarterly Report of the Louis Berger International, Inc. advisory team.

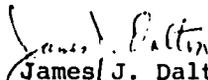
This Quarterly incorporates, also, the Monthly Report for January, 1980.

Separate copies will also be sent to the Project Director in Bangkok and USAID/Thailand.

As you will note, this Quarterly Report follows through on many aspects of the First Working Officers Seminar held at Lam Nam Oon, December 25-27, 1980. Our continuing review of the contents of that Seminar further expand our understanding of how much has been accomplished by you, the participating agencies, and the Team Leaders.

As our Advisory Team begins to expand it's activities we can do so in the knowledge that we have a good foundation on which to begin.

Sincerely yours,
LOUIS BERGER INTERNATIONAL, INC.


James J. Dalton
Team Leader

JD:nlp

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Chater I

Major Events During the Quarter

1. The December, 1979 Monthly Report of the Louis Berger International Inc. advisory team described the events of the First Working Officers Seminar held at Lam Nam Oon, December 25-27, 1979. That Seminar reviewed past work by participating agencies. It also identified major trends and issues yet to be clarified.
2. The Seminar review shows the following general status:
 - a. An Administration Center has been constructed, equipped, and staffed at the Lam Nam Oon dam site. This Center is to provide the logistic back-up, meeting facilities, and office space for technical advisory staff in matters concerning the plans and operations of the Integrated Rural Development project for the Lam Nam Oon area.
 - b. The Royal Irrigation Department (RID) has proceeded steadily to complete installation of the main canals, laterals, roads, and pumping stations in the Lam Nam Oon area. The current situation is:

- Left main canal system		
* 28.04 k. main		100% complete
* 74.60 km. lateral		" " "
* Roads along main/laterals		" " "
* Main pump station		" " "
* Pump Station L-3L		Complete this construction season
* Pump Station L-3L		Complete this construction season
- Right main canal system		
* 45.70 main		100% complete
* 122.86 k. lateral		100% complete
* 54.00 km. lateral		Complete in 1981
* 54.00 km. roads		" " " "
 - c. Drainage development work has been delayed because of several factors. The most politically important concerns the problem of aligning natural drainage channels and deepening same while also taking care of the property rights of affected farmers. It appears, now, that certain areas targetted for Land Consolidation may initially benefit from future drainage development work. That is, in areas to be affected by Land Consolidation, agreements on drainage can be linked with settlement of plot dimensions and boundaries among consolidating farmers. Other crucial factors affecting drainage include limited budget, lack of equipment, and the delayed arrival of technical advisory services. ||
 - d. Presently, RID has completed work on main canals and laterals to the extent that 72,000 Rai can be provided with irrigation water during the Dry Season of 1979-80. The attached, MAP A, shows the specific areas that can be provided with water through completed main canals, laterals, and ditch/dikes.

- e. While two Pilot Test Areas (1) and (3) have been developed in the project area, there has been insufficient operational research (principally engineering and water management) in those areas to provide the guidance essential to adequately implement RID's plans for Land Consolidation and new ditch/dike installations throughout the area.

This situation becomes a critical factor when it is understood that RID plans to complete Land Consolidation and install new Ditch/Dike systems totalling 225,500 Rai throughout the Lam Nam Oon area by the end of FY 1983-84.

The attached, MAP B, shows the proposed areas of intervention and the timings. (See, also, Chart A in the December, 1979 Monthly Report of the Berger Team.)

- f. With the assistance of the Office of Land Consolidation in Sakon Nakhon and participating Departments such as the Department of Agricultural Extension, the Department of Agriculture, and the Community Development Department, RID has encouraged farmers owning approximately 22,000 Rai to initiate the processes (legal and administrative) of Land Consolidation. Upon completion of those processes the actual physical work of realignment, levelling, bunding, road building, etc. will begin.
- g. An accompanying aspect of Land Consolidation in the Lam Nam Oon area is land levelling. Present experimental work on this has been carried out through RID Force Account operations in Pilot Area 3. Most of this work is nearing completion on 2,000 Rai. However, the high cost of levelling per Rai together with the shallow and fragile nature of the soils in the area signals an urgent need to review existing designs, supervisory methods, and future targets. This appears to be particularly pressing as a matter for attention since current land levelling plans envisage utilization of private contractors in order to expand Land Consolidation and the related levelling operations at a rapid pace in 1980, 1981, and 1982.
- h. Operations and Maintenance of the existing system, plus the additions yet to be completed, will require expanded RID staff and budget. Many of the main canals and laterals have been completed during the past six years; but, as yet, the Lam Nam Oon irrigation system has not been provided with budget, equipment, and staff sufficient to sustain minimal annual maintenance. Current and future projections on these matters indicate the following:

Budget (1979-80)		
Operational expenses		Baht 242,600
Maintenance		Baht <u>877,700</u>
	Total	Baht1,120,300

Staff:	Present	When system complete
Water control	4	48
Maintenance/canals	14	125
Maintenance/structures	16	158

- i. The Lam Nam Oon Field Management Organization appears to be in place and functioning. Team Leaders have been appointed by participating agencies, and agencies are budgeting special funds to support operations within the Lam Nam Oon area.

There is a need for further expansion of this system, together with the appointment of full-time Team Leaders at Lam Nam Oon and the development of integrated planning/implementation processes.

Engagement of policy support from national, changwat, and local elected and administrative official levels was identified at the seminar as a continuing and expanding need.

- j. Farmer utilization of the operating irrigation system is expanding. Preliminary land use figures at Amphur Phan Khone indicate that as irrigation water has become available during the past five years, the number of Rai under cultivation (largely in rice) during the Dry Season has gone up steadily:

Year 1976	40 Rai
" 1977	1,000 "
" 1978	2,500 "
" 1979	6,000 "
" 1980	8,000 "

Somewhat similar preliminary figures exist for Amphur Phanna Nikhom.

Though the area cultivated represents less than one-sixth of the irrigable land, this steady expansion attests to farmer interest even under conditions where current prices provide little incentive for Dry Season production of rice.

- k. Department of Agriculture applied research and seed multiplication activities in the Lam Nam Oon area are steadily intensifying. A total of 280 Rai were managed by the Department of Agriculture in plots scattered throughout the area during 1978-79. The work was done by cooperating farmers under the supervision of Department of Agriculture technical personnel. Some of the results obtained are described in Annex A, attached.

More than 500 Rai are undergoing research and multiplication activities during the current 1979-80 Dry Season.

- l. The Department of Agricultural Extension is expanding and strengthening its activities in the Lam Nam Oon area. It expects to be fully staffed with an Extension Worker (Kaset Tambol) in each Tambol by March 1, 1980. It will appoint a full-time Team Leader to be based at Lam Nam Oon- sometime in February, 1980.

Sakon Nakhon has now been selected as a participant in the IBRD-supported Training and Visit National Agricultural Extension Program. It is to become operational in this changwat on or before March 1, 1980.

Currently, the Department of Agricultural Extension has programmed use of almost Baht 400,000 in the Lam Nam Oon area in support of such activities as:

- 500 Rai of Demonstration Plots for crops such as Sweet Corn, Groundnuts, Mung Bean, Chillis, and various varieties of rice - during the Dry Season.
- Training Tambol Volunteer Farmers.
- Organizing and operating Agricultural Demonstration Days.

An indication of current conditions, to which the new initiatives of the Department will be addressed, is provided in the Agricultural Extension Report for January, 1980 - Annex B - attached.

- m. Community Development is maintaining a complete staff of CD Tambol workers in the Lam Nam Oon area. Currently, it is the only participating agency to assign a full-time Team Leader at the Lam Nam Oon site. That individual also serves as Assistant Field Director for the Lam Nam Oon Integrated Rural Development project.

CD has completed acquisition of 35 Rai of land at Ban Fang Daeng, Tambol Hi Yong, Amphur Phang Khone for use as the site for an Integrated Training Center. A hostel, capable of housing 60 trainees is almost ready for use, and additional training facilities will be completed within the next eight months. The Center will be operated by a three-person CD staff specially trained to design and operate those kinds of training programs most helpful to promotion of skills, knowledge, and participatory practices needed among farmers and local leaders in the Lam Nam Oon area.

CD activities in the area, to date, have placed much emphasis upon assisting other agencies to plan and operate programs essential to mobilizing popular support for irrigation-related activities. This includes: assistance on Land Consolidation briefings, promotion of Non-Formal Education activities, etc.

- n. Other participating agency operations that have gone forward steadily in the area include; the Department of Fisheries, and Non-Formal Education.
- o. Public Health, Education, Livestock, Land Development, and the Department of Co-operatives do not yet appear to be engaged in the project. One or two of these, notably Livestock, is becoming increasingly interested in participation. It is encouraged in this interest, particularly by the Department of Community Development.
3. As a result of decisions taken during the December, 1979 Seminar a review of participating agency Work Plans and Financial Plans began at Lam Nam Oon on January 15, 1980.

The review arose out of the fact that during the past year AID has not reimbursed participating agencies for expenses incurred when operating projects in the Lam Nam Oon area. According to various provisions in the AID loan several types of expenses can be reimbursed on a 50-50 basis, if agreement has been reached on a Work Plan and Financial Plan.

The exercise which began on January 15, 1980 was aimed at establishing an acceptable 8-month (remaining part of Fiscal Year 1980) Work Plan for each agency and a Financial Plan, where needed. This activity involved the Team Leaders, Berger team personnel, and agency coordinators at Bangkok.

By the end of January, 1980 agreement was reached on the strategy, work plans, and financial plans outlined in Annex C - attached.

At the beginning of February, these plans were being processed through the national headquarters of each participating agency. AID was preparing to make advance payments in some cases and reimbursements in others.

As will be noted when examining the contents of Annex C, it has been decided to concentrate attention on a specific Target Area: Tambols Pok Noi, Wang Yang, Rai, Phanna, and Chan Ming in Amphur Phanna Nikhom, Tambol Hi Yong in Amphur Phang Khone, and Pilot Areas 1 and 3.

The area is outlined in MAP C attached.

The next step in this Work Plan and Financial Plan development process is to deal with a 1981 budget for all participating agencies by not later than April 15, 1980.

4. An Irrigation Area Integration and Rural Development outline with water as the central axis was developed during the period. A schematic is provided in Annex D.

Under this approach attention to the Target Area will be based on an integrated planning and implementation strategy which revolves around the axis of year-round water supply for agricultural production in the Lam Nam Oon area. This strategy asserts that the Lam Nam Oon area has special water management, cropping, marketing, cultivation, soil amendment nutritional, training, participatory and health planning and implementation needs which each Thai government agency must deal with appropriately in consonance with their own general policies and modes of operation.

In that context, the Target Area will be an initial testing and training location. In it, all participating agencies will work together to define problems, their solutions, and means by which each agency can most efficiently speed the necessary improvement in skills, knowledge, and participation among farmers, local leaders, and officials.

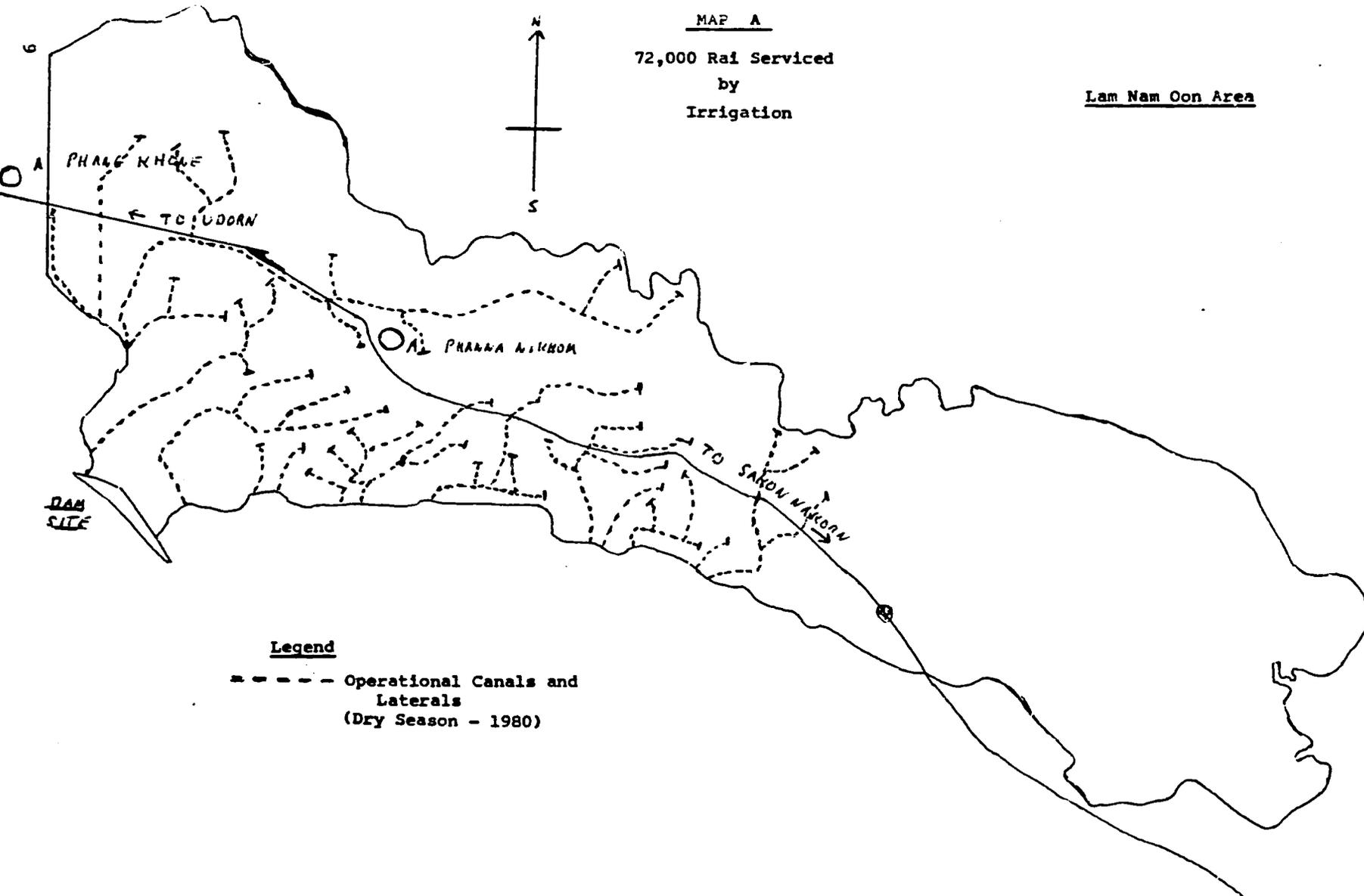
5. On January 15, 1980 the Lam Nam Oon project was visited by Mr. Tony Babb, Director of Agriculture and Rural Development, Development Support Bureau, AID, Washington, D.C.

Mr. Babb toured the project area and expressed keen interest in the continuing Royal Thai Government efforts to promote integration of activities in this project.

MAP A

72,000 Rai Serviced
by
Irrigation

Lam Nam Oon Area



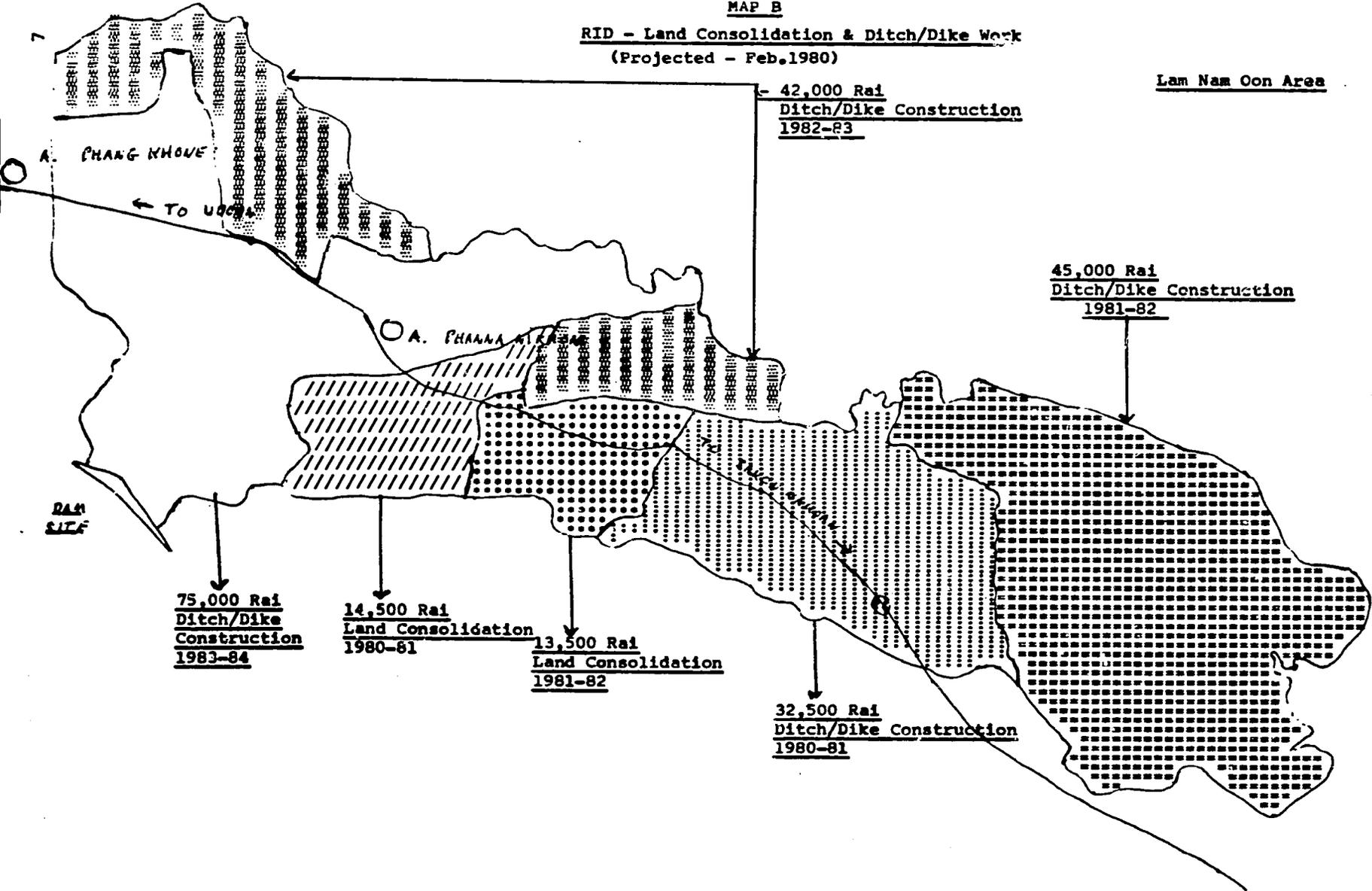
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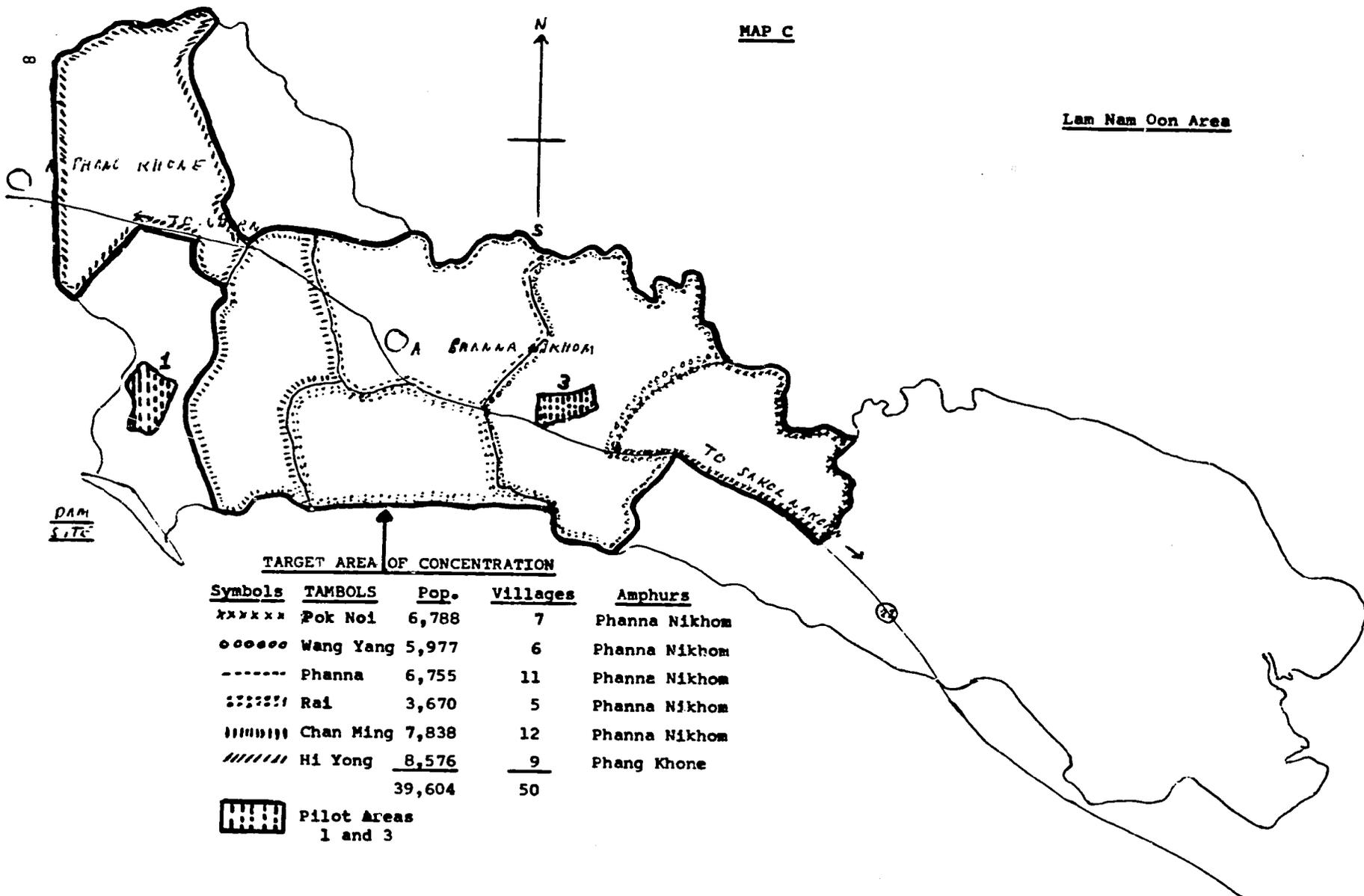
- - - - Operational Canals and
Laterals
(Dry Season - 1980)

MAP B

RID - Land Consolidation & Ditch/Dike Work
(Projected - Feb. 1980)

Lam Nam Oon Area





TARGET AREA OF CONCENTRATION

<u>Symbols</u>	<u>TAMBOLS</u>	<u>Pop.</u>	<u>Villages</u>	<u>Amphurs</u>
xxxxxx	Pok Noi	6,788	7	Phanna Nikhom
oooooo	Wang Yang	5,977	6	Phanna Nikhom
-----	Phanna	6,755	11	Phanna Nikhom
	Rai	3,670	5	Phanna Nikhom
	Chan Ming	7,838	12	Phanna Nikhom
	Hi Yong	<u>8,576</u>	<u>9</u>	Phang Khone
		39,604	50	
	<u>Pilot Areas</u>			
	1 and 3			

ANNEX A

Report on Activities Carried out in Lam Nam Oon
Project Area by Department of Agriculture during
B.E. 2522 (1979-80)

The activities have included:

1. Six experimental plots in Pilot Area Area 1 and Pilot Area 3 designed to improve rice increase yields both during the Dry Season and the Wet Season.
2. One experimental plot in Pilot Area 1 designed to test soybean yields and cultural practices during the Dry Season.
3. One experimental plot of two rai in Pilot Area 1 designed to test special Sweet Corn varieties and yields during the Dry Season.
4. One experimental plot in Pilot Area 1 designed to test Groundnut yields and cultural practices during the Dry Season.
5. Approximately 12 rai of Dry Season rice varieties were tested in Pilot Area 1 using Irradiation-treated Kaw Khaw 1 Rice Variety of 5-6-6 progeny, and BKN, BR Rice Variety of 1030-28-1-5 progeny.
6. Approximately 20 rai of Wet Season rice varieties were tested in Pilot Area 3 using Irradiation-treated Kaw Khaw 6 and 3 and 1 of 5-6-6 progeny.
7. A total of 56 plots covering about 200 rai in Amphurs Phang Khone and Phanna Nikom were Dry Season tested with Tainan 9 Groundnuts.
8. One plot in Pilot Area 1 was used during the Wet Season to test rice-growing by means of broadcasting re-germinated seeds.

9. A series of experimental plots totalling 30 rai in Pilot Area 1 were used to test systematic crop cultivation. A total of 7 systems were tested:
 - a. Rice - Rice
 - b. Groundnuts - Rice
 - c. Sweetcorn - Rice
 - d. Groundnut - Sweetcorn - Rice
 - e. Sweetcorn - Sweetcorn - Rice
 - f. Green Pea (Sugar pea) - Rice
 - g. Garlic - Rice
10. Four plots were used in Pilot Area 3 in order to test the use of Azzola Pinata (Nae Daeng) as a fertilizer in rice crops.
11. Sericulture tests and experiments were carried out in the Lam Nam Oor Settlement area.

Detailed Report on the Foregoing

1. Experimental Work on Increasing Yields of Rice and Economic Crops:
 1. Each was a five rai plot. Each plot was used for one rice variety, namely, either Kaw Khaw 1. No. 5-6-6 irradiated treated or BR 1030-25-1-5. Fertilizer application was N-P 206-K20 in the amount of 8-4-2 kilograms rai. A strip transplantation method was used. The strip width was 5 meters with a space of about 50 cm. between the strips. The space was used as a path for the purpose of facilitating fertilizer applications, insecticide spraying, and weeding. Two steps in fertilizer use took place. First during the transplantation, $\frac{1}{2}$ N-P+K, and during the flowering stage. For protection against rice pests, the chemical FURABARN was applied twice,

3 kilograms per rai each time. The first chemicals application was done 20 days after transplanting and the second application took place 20 days after the first. The farmers were constantly advised to control weeds very carefully.

Outcome:

<u>Plot</u>	<u>Variety</u>	<u>Fert/Kg/ Rai</u>	<u>Clumps/ Sq.M.</u>	<u>Ht.CM.</u>	<u>Ear/ Clump</u>	<u>Yields, Kgs./Rai</u>
1	Kaw Khaw 1 No.G-6-6	8-4-2	18.0	86.8	11.4	714.0
2	BR1030-28 -1-5	8-4-2	13.8	92.4	12.6	762.0
	Average		18.4	86.6	12.0	738.0

Note: The neighboring farmers rice yields were 422 kgs./Rai.

Conclusion: It was apparent that both glutinous rice varieties: Kaw Khae 1, No. 5-6-6, and BR1030-28-1-5, can yield high rates of about 71 to 76 Tang/Rai. This is nearly double yields obtained on neighboring plots by farmers who did not use fertilizer, strip transplantation, insecticides, and weeding in the same way.

Therefore, it is apparent that much higher rice yields can be obtained during the Dry Season in the Lam Nam Oon irrigation area if the farmers understand how to use better rice varieties, apply appropriate kinds and amounts of fertilizer, and use insecticides at the right times and amounts.

1.2 Groundnut production experiment and cultural practices.

A one rai plot was used at Pilot Area 1 to test two varieties of Groundnut. The two varieties were: Tainan 9 and Lampang. Each received the same fertilizer application of N-P206-K20 in the ratio 3-9-6 kgs./rai. This was done during the Dry Season.

To execute the experiment the plot was divided into two sections of two ngam (' rai) each. The first half was with the two varieties of Groundnut, but under the guidance of the Department of Agriculture. The other half was sown with the same two varieties; but the farmer was left to apply his traditional cultural practices.

Outcome:

<u>Variety & Process</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Wt. of Dry Pods Kgs/Rai</u>
Tainan 9 <u>Guided</u>	Feb. 10, 79	May 24, 79	66.6
Lampang	Feb. 10, 79	May 24, 79	39.5
Tainan 9 <u>Farmer</u>	Feb. 10, 79	May 24, 79	54.3
Lampang	Feb. 10, 79	May 24, 79	34.5

Conclusion:

It can be noted that in all cases these two Groundnut varieties yielded rather low results. This was due to late planting and the arrival of early rains - which caused much of the crop to become rotten. However, despite this circumstance, it is evident that the official guidance and regimen helped to produce higher yields. As between the two varieties, in both cases, the higher yield came from Tainan 9 - and it can be expected that this variety should obtain greater emphasis, in future, in the Lam Nam Oon area.

1.3 Soybean production experiment and cultural practices.

A one rai plot was used in Pilot Area 1 during the Dry Season in order to test two varieties of Soybean. The two varieties were: Saw Chaw 4 and Saw Chaw 2. The same test of fertilizer and constrastive cultural practices was carried out as described for (1.2) above.

Outcome:

<u>Variety & Process</u>	<u>Date Planted</u>	<u>Date Har-vested</u>	<u>Wt. of Dry Pods Kgs/Plot</u>	<u>Wt. Kgs/Rai</u>	<u>Wt. of 100 Seeds/Grade</u>
Saw Chan 4 Guided	Jan.6,79	April 28,79	45	180	16
Saw Chan 2	Jan.6,79	April 28,79	46	185	12
Saw Chan 4 Farmer	Jan.6,79	April 28,79	42	168	16
Saw Chan 2	Jan.6,79	April 28,79	45	180	12

Conclusion:

The experiments indicate that Saw Chan 2 variety of Soybean has a higher rate of yield under all conditions over Saw Chan 4. However, the yields for both varieties are rather low and it is necessary to continue to find and test varieties with higher yields. Meanwhile, these two varieties are still appropriate for growing in the area.

1.4 Experimental Plots for Special Sweet Corn Variety

One plot of two rai was used in Pilot Area 1 during the Dry Season in order to test vegetables and Hawaiian Sugar Super Sweet variety of Corn. In that section of the plot involved with the sweet corn a 20-20-0 application of fertilizer ($N-P_2O_5-K_2O$) was used in the amount of 50 kgs/rai.

This experiment of growing vegetables in one part and sweet corn in the other was aimed at checking comparative yields, but particularly income, and the sales of vegetables and sweet corn seed.

Outcome:

The returns showed that the one rai area devoted to vegetable production obtained an approximate income of Baht 700. The sugar corn crop brought a return of Baht 1,200, through selling for seed at Baht 40/kg.

However, the yield from the Sweet Corn variety used was comparatively low. This was due to the spread of stem borers which caused a loss during the growing season.

Conclusion:

Further tests of this variety are necessary. These tests must include greater attention to protection against stem borers and other pests or diseases. This should be done during the 1980 Dry Season.

1.5 Wet Season Rice Yield Experiments.

During the Wet Season of 1979, a total of 4 experimental plots were set up. These were distributed: 3 in Pilot Area 3, and 1 in Pilot Area 1. The process and practices were the same as those previously reported above during the Dry Season of 1979.

Outcome:

<u>Plot No.</u>	<u>Rice Variety</u>	<u>Amt. of Fert.</u>	<u>Clumps/ sq.m.</u>	<u>Hgt.</u>	<u>Ears per Clump</u>	<u>Yield Kgs/Rai</u>
1	Kaw Khaw 6	8-4-2	157	117.4	7.3	468/3
2	Kaw Khaw 6	8-4-2	133	121.7	9.1	777.5
3	Kaw Khaw 1 G-6-6	8-4-2	154	101.5	11.5	770.3
4	Kaw Khaw 6	8-4-2	149	152.7	8.4	503.1

Note: Plots 1, 2, and 3 were in Pilot Area 3; Plot 4 was in Pilot Area 1. Production in the neighboring farms at Pilot Area 3 averaged 319.9 Kgs/rai. Production in the neighboring farms at Pilot Area 1 Averaged 399.7 Kgs/rai.

Conclusion:

The general increase in yields for all plots tested above as compared to neighboring farms comes from the fact that the tests were carried out on consolidated

and levelled land. Differences in yields as between the various test plots varied from 46.8 Tang to 7.7 tang/rai. The outcome suggests the need for further testing on varying yields of soils in the Pilot Areas. This is to be done on a new and expanded scale, in the Wet Season of 1980.

1.6 Rice Yield Experiments using pre-germinated seeds broadcasting.

A plot was selected in Pilot Area 1 in order to test the yield of pre-germinated seed broadcast, instead of transplanted. This was contrasted with a neighboring farm using transplantation methods and the same fertilizer applications. The fertilizer was $N-P_2-O_5-K_2O$ applied in the same amounts of 8-4-2 kgs/rai.

The purpose was to get some idea of relative yields because farmers with larger holdings in the area are experiencing labor shortages for transplanting. This results in late planting, slow maturation, etc.

Outcome:

<u>Method</u>	<u>Rice Variety</u>	<u>Amt. of Fert. Kgs/Rai</u>	<u>Yield Kgs/Rai</u>
Broadcast	Kaw Khaw 8	8-4-2	373.0
Transplant	Kaw Khaw 7	8-4-2	476.0

Conclusion:

The test showed that the yield from transplanting is higher than broadcasting by about 10 Tang/rai. When one takes into consideration the expenses incurred in transplanting seedlings and the difficulties of obtaining adequate labor on time, it would appear that the broadcasting method might be given serious consideration. This is particularly true for farmers operating larger holdings of rice land. In addition,

the method permits timely cultivation. It, however, all requires further testing; and this will be done on a broader scale in both the Dry and Wet seasons of 1980.

2. Rice Varieties and Economic Crops extension

2.1 Dry Season rice variety extension plots:

During the Dry Season of 1979 the Sakon Nakhon Rice Experiment Station used 35 kgs. of Kaw Khaw 1 No. G-6-6 Rice Variety seeds for extension planting in a 7-Rai area in Pilot Area 1. The outcome from planting this variety showed an average yield of 576 kgs/rai. The total yield was 4,038 Kilograms. This production became available for use as seed plant material for use by farmers in the area.

Besides this activity, a similar task was undertaken on a 5-rai farm in Pilot Area 1 in order to produce BR 1030-28-0-5 rice variety. The yield was 494 kgs/rai, totalling 2,470 kilograms. This, too, was made available for use in the project area.

2.2 Wet Season rice variety extension plots:

During the Wet Season of 1979 the Sakon Nakhon Rice Experiment Station planted varieties on 18 rai of land in Pilot Area 3. The varieties included Kaw Khaw 1 G-6-6; Kaw Khaw 6, Kaw Khaw 7, and Kaw Kahw 8.

Outcome:

<u>Rice Variety</u>	<u>Paddy Land</u>	<u>Ave. Yield, Kgs. Per Rai</u>	<u>Total Yields</u>	<u>Type of Rice</u>
Kaw Khaw 1 G-6-6	7	790	5,530 Kgs.	Glutinous
Kaw Khaw 6	3	648	3,240 Kgs.	Glutinous
Kaw Khaw 7	5	727	3,635 Kgs.	Non-Glutinous
Kaw Khaw 8	3	462	2,386 Kgs.	Glutinous

Total production of all rice varieties was about 14,971 Kilograms. This will be utilized in the area during the next season to assist in seeding approximately 2,700 Rai, through the efforts of private farmers.

2.3 Groundnut variety extension plots in Dry Season:

During the Dry Season of 1979 the Sakon Nakhon Upland Crops Experiment Station planted Tainan 9 Groundnut seeds on 200 rai among 56 farms. The production yielded a total quantity of 26,134 Kgs. or an average of 130 Kgs. per rai. This amount was purchased back from the farmers by the Station at a cost of Baht 147,560. The Groundnut seeds are to be made available to other farmers in the Dry Season of 1980.

3. Establishing Pattern Crop Planting in Paddy Fields:

A plot of approximately 30 rai was used in the Dry Season of 1973 at Pilot Area 1 in order to test seven different patterns of planting. The objective was aimed at trying to determine how the farmer can gain the highest and most reliable yield and income per unit of area throughout a year.

The seven patterns included:

- 1 Rice - Rice
- 2 Groundnuts - Rice
- 3 Sweet corn - Rice
- 4 Groundnuts - Sweet Corn - Rice
- 5 Sweet Corn - Sweet Corn - Rice
- 6 Garden Peas (Genus Pisum) - Rice
- 7 Shallots & Garlic - Rice

Detailed analysis of this experiment is still not complete, since all results are not fully tabulated for the Dry Season of 1979 and the Wet Season of 1979. However, preliminary evidence drawn from the 1979 Dry Season effort seems to

indicate that Pattern 4 has a higher tendency to generate a better income than any of the other patterns. Yet, Sweet Corn has some problems on marketing - particularly if production is expanded. Therefore, it seems necessary to continue with further patterning tests using various combinations of crops suited to market and local conditions.

4. Studies and Improvement of Soil Fertility in the Paddy Fields

One plot was selected during the Wet Season of 1979 in Pilot Area 1 in order to carry out tests using Azzola Pinata (Nae Daeng) and Phosphate. The Nae Daeng culture was in the amount of 80 Kgs/rai for a period of 20 days and 4 kgs. of phosphate per rai was also used. This was followed by the second plowing and harrowing, and finally the normal transplanting.

The test indicates that the use of Nae Daneg is still handicapped. The Nae Daeng was regularly destroyed by worms. It was concluded that the test was not successful and that further test and study will have to take place during the Dry and Wet Seasons of 1980.

5. Sericulture

During 1979 the activity concentrated on the Lam Nam Oon up stream Settlement area and the following things took place:

- a. A demonstration of a good mulberry variety (Mon Noi) tree took place on 2.5 Rai.
- b. Mulberry trees were extended to 212 rai for 53 farmers.
- c. Production and distribution of 500 cross-breed silkworms, for use by participating farmers.
- d. Promotion of raising one crop of silkworms with a resultant 506 Kgs. of cocoons.
- e. One group of 24 farmers from the area was trained in how to grow silkworms.

ANNEX B

To: Team Leader, J.J. Dalton Date: February 6, 1980
From: George Hill
Subject: REPORT BY AGRICULTURAL EXTENSION CONSULTANTS,
JANUARY 1980.

From time of arrival at duty station January 7, 1980, this first month has been used to obtain a working knowledge of the people who live in the LNO project area, their villages, their farms and the public officers who serve them. Taking the course of protocol, calls were made first on the Governor of the Changwat and the Nai Amphurs of Pannanikon and Phang Khone. From these officers the three consultants, Hill, Chainarong, and Kosin exchanged introductions and views with the chief agricultural officers in the above units. However, the Changwat DOAE officer, who is also the Agricultural Extension Team Leader, Khun Nipan, was attending a seminar in Bangkok and was not scheduled to return until early in February.

None of the Land Rover trips to formalize the above professional processes were made without intervening stops to observe and to inquire into activities encountered enroute: rice milling, cooperative warehouses, tobacco operations, sugar cane activity, canal or ditch construction, etc.

Pilot Areas 1 and 3 were visited and farmers and Kaset Tambols and as many of their Volunteer Leaders as were appointed, were interviewed and future working plans discussed. Following these preliminary visits, arrangements were made with the Kaset Amphurs Pannanikon and Phang Khone, to visit Kaset Tambols. As a result visits were made to all DOAE demonstration farms and farmers in Tambols Wang Yang, Chan Ming, Phanna, and Rai

in the first above-mentioned Amphurs, and Tambols Rae and Hi Yong in the second. Visit to Tambol Phanna and its three demonstration farmers completed this phase of the introductory task 31 January.

The following summary of information and impressions is offered to conclude the consultant's inaugural report:

1. Each of the Tambols can now be assigned a DOAE officer because twenty officers have been assigned to the area by the national office. All seem to have motorcycles for transportation. Four of the twenty are girls. The men appear all to be Vocational Agricultural High School graduates, and the women have a variety of vocational technical training backgrounds. They are too young to have had previous extension or civil service experience and none seem to have had introductory or inaugural training courses in extension methodology or purpose and function of Kaset Tambols. They had only taken part in a short course of a few days duration in the rules and process of civil administration before taking their required civil service examinations.
2. A few, not many, of the tambols has an assigned Volunteer Leader or local farmer who has been selected to help the Kaset Tambol in his work; they are paid an honorarium of Baht 500 per month.
3. A tentative plan was suggested to and accepted by the two Amphur DOAE officers that the Kaset Tambol live in the seat of the Tambol and have his office there during week days Monday-Friday. One of these would be devoted to a weekly review meeting with the other officers, perhaps in the amphur seat, thus giving 4 nights per week in the Tambol seat and 3 in the Amphur. The DOAE Chiefs were told that AID might be prepared to pay per diem and lodging and some of the transportation costs, if needed. No decision was taken pending discussions with the Changwat Chief DOAE and careful follow-up with AID to be certain about policy. In assigning the officers to live

in the villages it was argued that a resident officer will have greater success in initiating a new program rather than if he were a commuter. There was unanimous Thai agreement on this score.

4. The Amphur officers were also informed that it might be possible to budget money for permanent housing and office construction in the Tambols. It was agreed it would be better to defer construction for perhaps the first year so as to have a better grasp of the nature of the program involved.

5. The consultants made it clear they would be in daily contact with the Kaset Tambols because the nature of the training task would not allow otherwise. They asked for Amphur DOAE officer supervision and participation. At this point, the Amphur DOAE officers demurred saying they were already so over-taxed with duties, including the responsibilities of the government's rice purchasing program, they would have no time for in-the-field day-by-day supervision as the consultants had planned, and would be able to give no more than some attention to the weekly staff meetings.

6.The demonstration farm program of the DOAE currently obligates the agency to provide seeds, insecticides, and fertilizers, but farmer after farmer complained they have as yet received no assistance and were wondering if the promises of the Extension Service would be kept. One said he hoped it wouldn't come as late as last year, when harvest time was at hand when the proffered fertilizer showed up. The gravity of the situation prompted a radiogram on the part of the writer to the Team Leader, (who was then (24 January) on duty in Bangkok) asking he try to obtain release of the AID fund for this emergency. Subsequently, the Governor of the Changwat speeded up the action and the necessary Thai Government funds have been released.

7. Breaks in canals and ditches were found in several instances to be causing planting delays. The drying up and dying of rice seed beds already planted, could also be seen. These are but minimal in size to the RID but not so to the farmers affected whose crop is endangered or lost as a result.

8. Asking a "demonstration" farmer which of his neighbors and how many had been over to observe his demonstration fields, the answer invariably was "none." On further questioning, he did not yet know why he had been selected and given or promised special assistance by the Extension Service. The Kaset Tambol could throw little more light on the meaning of "extension". They are learners said one of the consultants, so our task is clear -- teach the methods and programs of Extension to the Tambol officer so he, in turn, will be able to perform his tasks in his respective tambol. With so short a time at our disposal - four remaining months - the advisory Team will have to concentrate in a few Tambols in the hope that in that time some understanding of the meaning of elementary extension techniques might have been achieved.

The foregoing assumes, of course, the writer's evolutionary theory of teaching Agricultural Extension methods and philosophy. First, to hopefully get a few Kaset Tambols into effective conversation with an equally few number of contact farmers on the basic principles of dry season controlled irrigation farming in rice, peanuts, and perhaps one of the bean varieties. After this is done, not before, lead on to more technological problems and techniques (the change agent is not yet familiar with them, to say nothing of the farmer), and then on to the organizing of group activity.

ANNEX C
LAM NAM OON INTEGRATED
RURAL DEVELOPMENT PROJECT
WORK PLANS FINANCIAL PLANS

- NOTE:**
- The attached work plans and financial plans only concern - February 1 to September 30, 1980.
 - Revised work plans and financial plans for Fy 81, will be submitted by April 15, 1980.

WHY

This method is adopted because

1. A strategy for integrating inputs with soil, water, and cropping conditions must be developed and tested.
2. The Technical Advisory Team (Berger) has only one full dry season (irrigation period of November 1980 to May 1981) to test an Integrated Strategy with all technical inputs.
3. The Key Thai Agencies for the project: RID; CD; DOAE; DOA; and Non-formal Education are not yet adequately staffed for planning and implementation of all inputs at the site.
4. The inputs to be funded from the AID loan include a mixture of construction, expendable supplies, equipment, and Per Diem, Honoraria, contract funds. Some of these will impose administrative burdens on participating agencies (notably construction supervision, and equipment procurement).

SUGGESTED**INITIAL****STRATEGY****FOR PROJECT****PHASING:**

- Focus all participating agencies (with exception of Department of Public Welfare - Nikhom - Sericulture work) Upon:
- a) A Geographic area containing several Tambols, pilot test areas, and irrigation lateral

Canal zones that will contain (now or in the next two years) traditional ditch/dike; systems based on land levelling and consolidation; and new systems of ditch/dike design and management.

- b) Utilization of area (a) over a period of two Dry Seasons and one Wet Season as a place for testing integrated program development (irrigation) planning and training of personnel for each participating agency, in cooperation with farmers and local organizations.
- c) Selecting pilot area 2 and using it for testing extensive irrigated on-farm Development Techniques, Integrated with DOA and DOAE research and extension programs.
- d) Developing on-farm training, village training, and consolidated or special training programs and facilities based on experience earned in the area selected in (a) above.
- e) Involving farmers, local leaders, and officials in all of the activities undertaken above.
- f) Attention to costing inputs/outputs and determining sound water management practices and cropping patterns for the area.

DETAILS OF
INITIAL
STRATEGY

1. Recommended Geographic area for two Dry Seasons and one Wet Season (February 1980 - April, 1980 1st Dry Season: May 1980 - October 1980 Wet Season: November 1980 - April 1981 2nd Dry Season).

Pilot area 1

Pilot area 2 (to be selected and developed)

Pilot area 3

	<u>Number of Villages</u>
Tambon Chang Ming - Traditional ditch/dike	12
Tambol Phanna - Traditional ditch/dike	11
Tambon Hi Yong - Traditional ditch/dike	9
Tambol Rai - Landconsolidation/levelling	5
Tambol Wang Yang - Land consolidation/levelling	6
Tambol Pok Noi - Redesigned and managed ditch/ dike systems	<u>7</u>
Total	50

2. Plans and actions by each participating agency
(see Work Plans attached for items b, c, d, e,
for the initial strategy)

WORK

PLANS

AND

FINANCIAL

PLANS

ATTACHED

FOR

1. Community Development Department
2. Department of Fisheries
3. Department of Agriculture
4. Department of Non-Formal Education.
5. Department of Agriculture Extension (Plan and budget still under development on February 5, 1980).

COMMUNITY DEVELOPMENT DEPARTMENT
(February 1, 1980 to September 30, 1980)

Proposed CD Program in Recommended Area:

1. Involve farmers, local leaders and officials in the planning and operation of all project - related activities:
 - a) Discuss the program with each Sapha Tambol in the affected area and Pilot Test areas.
 - b) Discuss the program with each Village Development Committee in the approximate 50 villages affected by the scale of operations.
 - c) Work with DOAE and RID among approximately 50 farmers (1 per village) involved with Special Test and Demonstration activities in water measures, water management, cropping tests, liming, soils amendments, water system and maintenance organizational arrangements.

2. In consultation with RID, the Land Consolidation Office, DOA, DOAE, and Non-formal Education (Village Information program) develop a system (messages and methods for delivery) to explain the following to all farmers concerned (approximately 1,000) in Tambols Wang Yang and Rai (at least 3 recorded contacts per year):
 - a) The meaning and processes of Land Consolidation, including the economics of the approach and the administrative/managerial arrangements. Also convey information about the process as related to formalizing land ownership rights.
 - b) The advantages of Land Consolidation (data on yields) and the obligations (controlled use of water, maintenance of ditch/dikes, soil testing, use of liming, Chak organization for participating farmers, and planned cropping.)
 - c) The meaning of land levelling and the process; the advantages - and the limits (cannot level too elevated soils).

3. Do the same as (2) above in the irrigation - extensive Tambols of Chang Ming, Phanna, Hiyong, and Pok Noi with RID, DOAE, DOA: and Non-formal Education Concerning the subjects of: (cover 1,000 farmers, 3 times/yr.)
 - a) water use and organization,
 - b) research results on crops and cropping practices
 - c) liming.

4. Develop, with the help of DOAE, and Non-formal Education, a specific set of high value crop tests in 5 villages within the area. Emphasize crops not normally included in extension work as well as those of great interest to DOA, Department of Fisheries and the Department of Livestock:
 - a) mushrooms
 - b) vegetables
 - c) fruit trees - mango, cashew nut, tamarind
 - d) poultry

Where necessary, these are to be technically supported by the Departments concerned.

5. Using Existing Systems as a model, but expanding the emphasis upon soils improvement among 5 villages in the irrigation - extensive Tambols foster composting and utilization campaigns upon particular soils.

6. Develop Involvement, Utilization, and Implementation Indicators including systems to record same over time.

7. Begin physical development of an Integrated Training Center, at Tambol Hi Yong, which will be staffed and operated to train selected farmers, villagers, and local leaders drawn from the entire project area in matters concerning organization, planning, management, evaluation and specific agriculture or water management technologies.

Initial physical construction during the eight-month period will be add-on to what has already been done, including:

+ Donations of 36 Rai by villagers and the government (value: Baht 180,000 Rai)

+ Completion of a hostel capable of housing up to 60 personnel (value: Baht 300,000).

The add-ons will include for 1980 (designs will be adjusted to the money ceilings as stated):-

a) Land levelling of 35 Rai and the creation of plots with new ditch/dikes.	Estimated cost:	฿ 40,000
b) An administrative Center with offices and meeting rooms.	Estimated costs:	฿ 250,000
c) Residences for 2 CD Training officers.	Estimated costs:	฿ 85,000
d) Water supply system for complex	Estimated costs:	฿ 197,000
e) Electricity Supply system	Estimated costs:	฿ 100,000
f) Child Development Center designed to service the area and also to act as training demonstration facility.	Estimated costs:	฿ 90,000
g) Fence and gate around compound	Estimated costs:	฿ 80,000
h) Toilets and baht facility	Estimated costs:	฿ 90,000
i) Workshop	Estimated costs	฿ <u>293,000</u>
	Total	Baht 1,225,000

8. Begin curriculum development for the Integrated Training Center at Tambol Hi Yong by assigning future center staff to daily participation in the field during the three seasons among the pilot test areas and tambols in the recommended geographic area. Locate them temporarily, for residential purposes, at Amphur Phanna Nikom.
9. Assign all CD Project Staff for field training in the geographic area for 14 months (February, 1980 through April 1981) on the following schedules:
 - a) 3-person CD instructional staff for Integrated Training Center: Full-time/month.
 - b) 7 Tambol CD workers assigned to selected geographic area: Full time/month.
 - c) 6 Tambol CD workers assigned to other Tambols in project area; 10 days/month.
 - d) 2 Amphur CD workers assigned to Amphurs in which the geographic area is situated: full time/month.
 - e) 1 Amphur CD worker situated outside the geographic area of emphasis: 10 days/month.
 - f) CD Team Leader: full time/month
 - g) CD Changwat officer: 10 days/month

Financial plan for first 8 months attached.

Showing Balances Remaining for Fy 1981, Fy 1982

	<u>Total Loan Paper</u>			<u>Balance for Fy 81, Fy 82 (After Deducting 8 mos. Fy 80)</u>		
	<u>AID</u>	<u>RTG</u>	<u>Total</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
Land & Const.	762,000	763,000	1,525,000	0	0 ⁽¹⁾	0
Expendable supplies	510,000	510,000	1,020,000	263,090	343,090	606,180
Equipment	497,000	497,000	994,000	357,700	497,000	854,700
Salary, wages, per diem	2,139,000	2,144,000	4,283,000	1,854,200	1,898,300 ⁽²⁾	3,752,500
Activity fund	249,000	249,000	497,000	249,000	1,000 ⁽³⁾	250,000
	4,157,000	4,163,000	8,320,000	2,723,990	2,739,390	5,463,380

(1) RTG spent for construction of a Hostel at LNO Training Center $\text{N}300,000$ in 1979

(2) RTG spent for Per-diem travelling & lodging for 18 CD persons $\text{N}289,000$ in 1979

(3) RTG spent for 2 Child Delv. Center and 1 Demonstration plot at the cost of $\text{N} 150,000 + 50,000 = 200,000$ in 1979.

Community Development

Financial Plan

(Baht)

(QUARTER)

	2nd		3rd		4th		Total AID	Total RTG	Combined Total
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>			
<u>Totals</u>									
Land & Const.	325,000		437,000			463,000	762,000	463,000	1,225,000
Supplies	167,410		63,250	51,250	16,250	115,660	246,910	166,910	413,820
Equpt.	139,300						139,300		139,300
Temporary Wages	14,400		10,800	8,000	10,800	8,000	36,000	16,000	52,000
Per Diem, Lodging, Travel and Other Expenses	59,200	41,300	110,800	104,200	78,800	64,200	248,800	229,700	478,500
Totals	705,310	41,300	621,850	163,450	105,850	670,860	1,433,010	875,610	2,308,620

Community Development

Financial Plan

(Baht)

	2nd		3rd		4th		Total	Total	Combined
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Land & Const.</u>									
- Levelling land and making plots with ditch/dikes on 36 Rai	30,000		10,000				40,000		40,000
- Adm. Center	100,000		150,000				250,000		250,000
- Residences for CD Staff	35,000		50,000				85,000		85,000
- Water Supply System	80,000		117,000				197,000		197,000
- Electricity System	40,000		60,000				100,000		100,000
- Child Develop. Center	40,000		50,000				90,000		90,000
- Fence and Gate around Compound						80,000		80,000	
- Toilets and Bath Facility						90,000		80,000	90,000
- Workshop						293,000		293,000	293,000
Sub-Totals	325,000		437,000			463,000	762,000	463,000	1,225,000

Community Development
Financial Plan
(Cont)

	<u>2nd</u>		<u>3rd</u>		<u>4th</u>		<u>Total</u>	<u>Total</u>	<u>Combined</u>
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Supplies</u>									
- Bedding for Officers 6 sets	1,500					1,500	1,500	1,500	3,000
- Bedding for Trainees 60 sets	6,000					6,000	6,000	6,000	12,000
- Hoe, 30 each	1,350					1,350	1,350	1,350	2,700
- Food tray, large 100 each	3,500					3,500	3,500	3,500	7,000
- Food tray, medium 60 each	1,800					1,800	1,800	1,800	3,600
- Cooking pot, large 10 each	500					500	500	500	1,000
- Cooking stove, large 6 each	180					180	180	180	360
- Cooking knife large 4 each	80					80	80	80	160
- Cooking knife small 4 each	80					80	80	80	160
- Fork and spoon 200 each	800					800	800	800	1,600

Community Development
Financial Plan
(Baht)

	2nd		3rd		4th		Total	Total	Combined
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Supplies (Cont'd)</u>									
- Plastic Cup 200 each	200					200	200	200	400
- Water pot, 6 each	510					510	510	510	1,020
- Cooking spoon 6 each	60					60	60	60	120
- Food cabinet 2 each	700					700	700	700	1,400
- Table 5 x 1 m. 2 each	1,000					1,000	1,000	1,000	2,000
- Chicken breeding cock. 10 each	250					250	250	250	500
- Chicken breeding hen, native, 100 each	1,500					1,500	1,500	1,500	3,000
- Feeding and watering equpt. 10 sets	600					600	600	600	1,200
- Concentrate chicken feed	10,000		7,000			17,000	17,000	17,000	34,000
- Vet. Medicines	5,000					5,000	5,000	5,000	10,000
- Seeds			2,500		2,500		5,000		5,000
- Lime	5,000					10,000	5,000	10,000	15,000
- Fertilizer	2,500					2,500	2,500	2,500	5,000

Community Development
Financial Plan
(Baht)

	2nd		3rd		4th		Total	Total	Combined
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Supplies (Cont'd)</u>									
- Pesticide	1,500		1,500			3,000	3,000	3,000	6,000
- Film, slide	1,000		1,000			2,000	2,000	2,000	4,000
- Office Stationery	4,000					4,000	4,000	4,000	8,000
- Printed matter	800						800		800
- Text Books and Hand Books	2,000					2,800	2,000	2,800	4,800
- Materials for Training in LNO Center			20,000		20,000	30,000	30,000	30,000	60,000
- Materials for for Training in Villages	20,000		20,000	40,000			40,000	40,000	80,000
- Gas, oil, lube	15,000		11,250	11,250	3,750	18,750	30,000	30,000	60,000
- Materials for building a chicken house 5m x 15m	15,000						15,000		15,000
- Materials for building bio-gas plant	15,000						15,000		15,000
- Materials for integrated livestock and fish-raising pond	30,000						30,000		30,000

Community Development

Financial Plan

(Baht)

	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total AID</u>	<u>Total RTG</u>	<u>Combined Total</u>
	2nd		3rd		4th				
<u>Supplies (Cont'd)</u>									
- Materials for green fodder demonstration on 5 Rai	20,000						20,000		20,000
Sub-Totals	167,410		63,250	51,250	16,250	115,660	246,910	166,910	413,820
<u>Equipment</u>									
- Camera & Flash 1 each	8,000						8,000		8,000
- Thai language type- writer	10,000						10,000		10,000
- Desks & Chairs 5 each	7,500						7,500		7,500
- Conference Table(1)	2,500						2,500		2,500
- Folding Chairs(50)	4,000						4,000		4,000
- Chair with writing pad. 50 each	7,000						7,000		7,000
- Filing Cabinet(3)	4,500						4,500		4,500
- Bed for staff residence (6)	4,800						4,800		4,800

Community Development

Financial Plan

(Baht)

	<u>2nd</u>		<u>3rd</u>		<u>4th</u>		<u>Total</u>	<u>Total</u>	<u>Combined</u>
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Equipment (Cont'd)</u>									
- Water Tank, 400 gal. with stand(10)	28,000						28,000		28,000
- Hand Sprayer with toxic protection outfits(2)	2,000						2,000		2,000
- Water Pump, 10 H.P. with delivery hose(1)	20,000						20,000		20,000
- Overhead Projector(1)	14,000						14,000		14,000
- Portable Generator 1 each	6,000						6,000		6,000
- Accessory, Audio- Visual equpt.									
- Slide Projector(1)	6,000						6,000		6,000
- Amplifier, speaker, mikes(1)	15,000						15,000		15,000
	<u>139,300</u>						<u>139,300</u>		<u>139,300</u>
Sub-Totals	139,300						139,300		139,300

Community Development

Financial Plan

(Baht)

	2nd		3rd		4th		Total	Total	Combined
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Temporary Wages</u>									
- Local Technical resource persons @ Baht 30/hr. x 200 hrs.				3,000		3,000		6,000	6,000
- Labor costs at Baht 36/day x 1000 days	14,400		10,800		10,800		36,000		36,000
- Special cost for locally employed technical trainers at Baht 50/hr. x 200 hrs.				5,000		5,000		10,000	10,000
Sub-Totals	14,400		10,800	8,000	10,800	8,000	36,000	16,000	52,000
<u>Travel, Per Diem & Other Expenses</u>									
- 3-Person CD staff for Integrated training Center working full-time in Target area @ Baht 100/day for 11 days (AID) and 15 days (CD) x 8 mos.	6,600	9,000	9,900	13,500	9,900	13,500	26,400	36,000	63,400

Community Development

Financial Plan

(Baht)

	<u>2nd</u>		<u>3rd</u>		<u>4th</u>		<u>Total</u>	<u>Total</u>	<u>Combined</u>
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Travel, Per Diem and</u> <u>Other Expenses (Cont'd)</u>									
- 7 Tambol CD workers in target area full- time Baht 100/day for 11 days (AID) and 15 days (CD)/mo. x 8 mos.	15,400	21,000	23,100	31,500	23,100	31,500	61,600	84,000	145,600
- 6 Tambol CD workers concentrating 11 days per month on target area (AID) @ Baht 100/day x 11 x 8	13,200		19,800		19,800		52,800		52,800
- 2 Amphur CD workers full-time target area @ Baht 120/ day x 10 days (AID) and 10 days (CD) x 8 mos.	4,800	4,800	7,200	7,200	7,200	7,200	19,200	19,200	38,400
- 1 Amphur Muang CD Off. in target area 10 days per month @ Baht 120/day x 10 x 8 mos (AID)	2,400		3,600		3,600		9,600		9,600

Community Development

Financial Plan

(Baht)

	<u>AID</u>	2nd <u>RTG</u>	<u>AID</u>	3rd <u>RTG</u>	<u>AID</u>	4th <u>RTG</u>	<u>Total AID</u>	<u>Total RTG</u>	<u>Combined Total</u>
<u>Travel, Per Diem and</u>									
<u>Other Expenses (Cont'd)</u>									
- 1 CD Team Leader working 10 days in Target area (AID) & 10 days (RTG) @ Baht 120 per day x 8 mos.	2,400	2,400	3,600	3,600	3,600	3,600	9,600	9,600	19,200
- 1 CD Changwat Coord- inator 25 days/mo. in target area @ Baht 120/day (AID 10 day x 3,000 person- days	12,000		40,000	40,000	8,000	20,000	60,000	60,000	120,000
- Electricity charges for LNO Integrated Training Center		<u>500</u>		<u>3,000</u>		<u>3,000</u>		<u>6,500</u>	<u>6,500</u>
Sub-Totals	59,200	41,300	110,800	104,200	78,800	84,200	248,800	229,700	478,500

ANNEX C-2DEPARTMENT OF FISHERIES

(February 1, 1980 to September 30, 1980)

Proposed Department of Fisheries program in recommended area:

1. Locate and develop 10 Demonstration fish ponds in the area. Cooperate in these matters with CD, DOAE, DOA, and the Department of Non-formal Education.
2. Develop Lam Nam Oon reservoir fishing during the period with:
 - a) 1,000,000 fingerlings
 - b) 10 demonstration fish cage culture projects
 - c) Improved access to two fishery landing sites. (Huey Lek Fai, and Dong Kham Pho).
3. Develop and operate a 8-day Training course on fish pond culture/mgmt. for selected CD, DOAE, RID, and Non-formal Education personnel drawn from the geographic area of concentration together with selected farmers. Total number of all trainees - 50.
4. In collaboration with DOA, DOAE, and CD test the usefulness of the aquatic plant, azzola pinata.
5. Develop Involvement, Utilization, and Implementation Indicators including systems to record same.

Financial plan for first 8 months attached:

SUMMARY : 8 MONTHS OF 1980 (Baht)
(Department of Fisheries)

NOTE: As outlined on the next page in a detailed statement, the Department of Fisheries, in 1979, expended Baht 1,051,000 on this project.

The Department received no counterpart contribution from the AID loan fund for 1979.

The Department proposes, for the 8-month 1980 budget, that AID agree to meet all the budgeted costs outlined in the detailed budget attached herewith. The total is Baht 836,240.

The Department also proposes that a flexible approach be adopted to handling the various categories in the AID and RTG loan fund as specified in the loan document. Instead, the Department would prefer to see the total funds from AID and RTG treated as the criteria or ceiling - rather than the amounts now specified in each category or sub-item.

Following the above-outlined policy, the Summary Budget would be:

	<u>AID</u>	<u>RTG</u>	<u>TOTAL</u>
<u>Land and Construction</u>	100,000	0	100,000
<u>Expendable Supplies</u>	464,000	0	464,000
<u>Equipment</u>	67,400	0	67,400
<u>Temporary Wages and Salaries</u>	130,640	0	130,640
<u>Travel, Per Diem and Other Expenses</u>	48,000	0	48,000
<u>Training Expenses</u>	<u>26,200</u>	<u>0</u>	<u>26,200</u>
Totals	836,240	0	836,240

Above deducted from Total in Loan Paper, together
with sum spent by RTG in 1979 (Baht 1,051,800)
showing balances remaining for Fy 81, Fy 82

<u>Total in Loan Paper</u>			<u>Balances remaining after 1980,1979 are deducted - (for use Fy 81,Fy82)</u>		
<u>AID</u>	<u>RTG</u>	<u>Total</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
2,130,000	2,130,000	4,260,000	1,293,760	1,078,200	2,371.960

Detailed 1979 Expenditures on
Lam Nam Oon Project - by Department of Fisheries

<u>Equipment:</u>	Baht 766,000
1 Motor Car for Field Work - Baht 270,000	
1 2-ton Truck - Baht 153,000	
3 100 c.c. motorcycles - Baht 39,000	
1 Slide Projector - Baht 25,000	
6 Thaparit Water Pumps - Baht 216,000	
1 Slide Projector - Baht 7,700	
1 Camera - Baht 6,200	
1 50 mm. Purse Seine - Baht 49,100	
 <u>Temporary Wages and Salary</u>	 Baht 54,000
5 Laborers at Baht 900/mo. x 12 mos.	
 <u>Per Diem and Travel Costs</u>	 Baht 50,000
 <u>Expendable Supplies</u>	 Baht 181,800
Concetrate fish feed and fertilizer for Lam Nam Oon reservoir fingerlings and demonstration ponds in Lam Nam Oon area.	
Totals	Baht1,051,800

DEPARTMENT OF FISHERIES
FINANCIAL PLAN
(BAHT)

CLASS AND ITEM	FY 1980									
	1st Qtr		2nd Qtr		3rd Qtr		4th Qtr		Total AID	Total
	AID	RTG	AID	RTG	AID	RTG	AID	RTG		
<u>LAND AND CONSTRUCTION</u>										
- Land levelling two fish landing sites, and improving access roads at Lam Nam Oon reservoir (at Huey Lek Fai and Dong Kham Pho)			100,000	0					100,000	100,000
Sub-Total			100,000	0					100,000	100,000
<u>EXPENDABLE SUPPLIES</u>										
- Concentrate food and fertilizer to produce 1 million fingerling for release in Lam Nam Oon reservoir.			80,000	0					80,000	80,000
- Concentrate food and fertilizer for fish culture extension in the target area			90,000	0					90,000	90,000
- Material for 10 demonstration ponds in the selected target area			80,000	0					80,000	80,000
- Material for 10 demonstration fish cage culture sites within Lam Nam Oon reservoir			160,000	0					160,000	160,000

DEPARTMENT OF FISHERIES
FINANCIAL PLAN
(BAHT)

CLASS AND ITEM	FY 1980								Total AID	Total
	1st Qtr		2nd Qtr		3rd Qtr		4th Qtr			
	AID	RTG	AID	RTG	AID	RTG	AID	RTG		
<u>EXPENDABLE SUPPLIES (cont'd)</u>										
- Photographic and audio-Visual supplies			1,000		1,500		1,500		4,000	4,000
- Scientific supplies, chemicals, artificial insemination materials			2,500		3,750		3,750		10,000	10,000
- Gasoline, oil, for transport, pump operations at hatchery on support for Lam Nam Oon fingerlings pre			10,000		15,000		15,000		40,000	40,000
<u>Subject-total</u>			176,000		144,000		144,000		464,000	464,000
<u>EQUIPMENT</u>										
- Floating boat dock at Lam Nam Oon reservoir			67,400						67,400	67,400
<u>Subject-total</u>			67,400						67,400	67,400
<u>TEMPORARY WAGES AND SALARIES</u>										
- Boat pilot/operator for Lam Nam Oon reservoir Baht 1,395 x 8 mos.			2,790		4,185		4,185		11,160	11,160
- Monitors on fish catch at reservoir. Baht 1,080 x 2 x Baht 1,080			4,320		6,480		6,480		17,280	17,280

DEPARTMENT OF FISHERIES
FINANCIAL PLAN
(BAHT)

CLASS AND ITEM	FY 1980									
	1st Qtr		2nd Qtr		3rd Qtr		4th Qtr		Total AID	Total
	AID	RTG	AID	RTG	AID	RTG	AID	RTG		
<u>TEMPORARY WAGES AND SALARIES</u>										
- Laborers at Station, ponds, and reservoir (10) Baht 1,080 x 10 x 8 mos.			21,600		32,400		32,400		86,400	86,400
- Tractor driver # 1,975/mo. for 8 mos.			<u>3,970</u>		<u>5,925</u>		<u>5,925</u>		<u>15,800</u>	<u>15,800</u>
<u>Sub-total</u>			32,680		48,990		48,990		130,640	130,640
<u>TRAVEL, PER DIEM AND OTHER EXPENSES</u>										
- Fisheries Dept. Technical Workers at reservoir and selected target area at Baht 100 per day x 10 day/mo. for worker or Baht 1,000 x 6 x 8 mos.			<u>12,000</u>		<u>18,000</u>		<u>18,000</u>		<u>48,000</u>	<u>48,000</u>
<u>Sub-totals</u>			12,000		18,000		18,000		48,000	48,000
<u>TRAINING</u>										
- <u>Per Diem</u> and training expenses (including travel) for 50-trainees in 8-day training course at Baht 68 per day			<u>26,200</u>						<u>26,200</u>	<u>26,200</u>
<u>Sub-totals</u>			26,200						26,200	26,200

	II Jan-March		III April-June		IV July-Sept		AID Total	RTG Total	Combined Total
	AID	RTG	AID	RTG	AID	RTG			
<u>Activity Supporting Fund</u>									
- Training of 13 Sapa-Tambol 2 days	9,000	9,000	9,000	9,000	-	-	18,000	18,000	36,000
- Training of 88 village development committee	21,000	21,000	27,000	27,000	-	-	48,000	48,000	96,000

ANNEX C-3DEPARTMENT OF AGRICULTURE

(February 1, 1980 to September 30, 1980)

Proposed Department of Agriculture program in recommended area:

1. Concentrate on-farm trials and Applied Research in the farmers fields in Pilot Areas 1 and 3. When Pilot Area 2 is selected gradually increase priority for research on that Area. Cooperate in these matters with DOAE, CD, RID, and the Department of Non-formal Education where appropriate.

Place stress on the following objectives:

- a) Conduct varietal trials on rice and field or other economic crops suited to the soil and water conditions within the area.
- b) Carry out on-farm tests regarding technology like soil tests, variety use, fertilizer, water applications, cultivation, planting practices, protection measures, and other cultural practices for rice and field or other economic crops judged to be agronomically suited to the area.
- c) Develop liming tests, management, and related costing studies for 7 selected sites each on pilot areas 1 and 3 and on various other soils as possible in the area.
- d) Set up a plan to develop crop yield constraint studies to be done in 1981 on a very modest scale. (such studies to include agronomic, and agro socio-economic aspects)

- e. Conduct on-farm tests on rice-based cropping systems under the project area soil and water management conditions - as fitted to available farm resource and potential marketing conditions.
 - f. Test feasibility of increasing the yield of the field crops of economic promise - suited to the soils and water conditions in the irrigated area.
2. Within the various Tambols of the selected area, plus Pilot Areas 1, 2, 3:
- a. Conduct seed multiplication work on rice and field or other economic crops in order to supplement the needs of farmers and the extension program.
 - b. Support the development of tests on the Utilization of the aquatic plant, Azzola Pinata. Assist the Department of Fisheries in this matter, where relevant.
 - c. In particular collaboration with the Tambol Kasets and Tambol CD personnel develop a backup system for Diagnosis and identification of disases and pests occurring in the area system includes Khon Kaen Rice Experiment Station; North-eastern Research Center, Tha Phra, Khon Kaen; and Bangkok Entomology and Zoology Division.
 - d. Obtain and review, as well as test where appropriate, all relevant experience about water management, soils testing and management, cropping appropriate to irrigation systems. etc. Information to be drawn from such places

as the Kalasin Research and Training Center for Irrigated Agriculture and nearby Research Centers and Experiment Stations.

3. Carry out research on sericulture as well as intensive training on modern sericulture for those individuals involved in this matter in the Nihom area upstream from the Lam Nam Oon dam.
4. Collaborate with CD and Non-Formal Education in particular to develop and test some High Value Crops; but concentrate initially in carrying out such work on pilot Area 3 - with a gradual shift to Pilot Area 2 (as this is developed). Current and future work would follow the general outline of:
 - a. Emphasis upon less perishable crops such as: chillis, onion, garlic, and eggplant.
 - b. Growing emphasis upon more perishable crops such as cucumbers, cauliflowers, tomatoes, etc.
 - c. Development of fruit trees producing fruit for family consumption. Assistance on this effort to be provided by the Northeastern Research Center, Tha Phra, Khon Kaen.
5. While DOAE and RID have priority in observing farmer behavior in managing on-farm irrigation water and sharing/distributing water within Chaks, DOA will also observe these matters with particular reference to Pilot Areas 1, 2, and 3. Observations should be designed so as to provide useful background in developing viable farmer water-use organizations and practices.
6. Collaborate with RID, CD, DOAE, RID, and other agencies in explaining Land Consolidation advantages and obligations to farmers in Tambols Rai and Wang Yang.

7. In collaboration with CD, DOAE, RID, Non-formal Education and Fisheries develop pilot-model farmer training programs related to the foregoing. These are to be developed and tested in the selected area. Successful training models will then be transferred, in the coming year, to the Integrated Training Center (CD) in Tambol Hi Yong and to other field locations in various Tambols.
8. Develop some Involvement, Utilization, and Implementation Indicators including systems to record same over time.
9. Develop the DOA staff, housing, warehouse, equipment, and supplies capacities to support the foregoing.

General pattern of operations:

The different tests are to be carried out by various Divisional researchers from the Experiment Stations located in Sakon Nakhon and nearby provinces. The on-farm tests will be mainly of a simple trial design. As much as possible, sites will be concentrated on Pilot Areas 1, 2, and 3 and Tambols in the selected area. Most of the trials are to be operated by farmers themselves supplemented by hired laborers under intensive supervision by the researchers. Materials such as seeds, chemicals, etc. used in the test plots are to be provided by the respective Experiment Stations. Produce from the test areas are to be returned to the farmers except in the case of seed multiplication work. In that case, the concerned Divisions purchase the product.

The field operations and data collection are to be recorded by assistant researchers according to crop stages. Team leaders and senior research personnel will visit farms periodically. At harvest, crop yields are to be estimated with economic analysis and the agronomic/soil/water feasibility of each crop determined for particular soils and agro-climatic zones.

After final interpretation of results, the most recommended practices are to be turned over to the Tambol Kaset in the selected area - for demonstration and extension.

1980 Target Plans for each Division:

Following the emphasis upon Pilot Areas 1, 2, and 3 - with some work in the Tambols among the selected area, the various Divisions will generally pursue the targets outlined below:

1. Sakon Nakhon Rice Experiment Station, Rice Division:

- Rice seed multiplication
Sites totalling 2 to 3 Rai
- Rice varietal trials suitable to soil conditions and agro-climatic factors
Sites totalling 2 to 3 rai
- Azzola Pinata trials
5 Rai in the Dry Season and 15 Rai in the Wet Season.

2. Sakon Nakhon Field Crop Experiment Station: Field Crops Division

- Groundnut, soybean, and mung bean multiplication
Areas totalling 200 Rai
- Tests on yield improvement of groundnut, soybean, mung bean, and cotton.
Areas of: groundnut - 2 Rai, Soybean - 2 Rai; Mung bean - 1 Rai; Cotton - 1 Rai.
- Test on corn production
Area of - 1 Rai

3. Agronomic Management Branch, Technical Division

1. High Yield Trial (DS'80)

- Phanna Nikom	Wang Yang	Wang Yang	2*	P.A.3
Chang Ming	Nong Dern		1	
	Dom Phai		1	
	Chang Ming		1	
- Phang Khone	Hi Yong	Hi Yong	1	
	Rae	Rae	1	P.A.1
			<u>1</u>	
			Total	7 sites

2. Management Packages Levels Trial (DS'80)

- Phang Khone	Hi Yong	Hi Yong	1	
	Nong Chode		<u>1</u>	
			Total	2 sites

3. Germinated Direct Seeded Rice Trial (DS'80)

- Phanna Nikom	Wang Yong	Wang Yang	1 sites	* P.A.3
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B. Rice-Based Cropping System Trial

- Phanna Nikom	Chang Ming	Oom Phai	1	
	Wang Yang	Ban Piey	2*	P.A.3
- Phang Khone	Hi Yong	Nong Chode	1	
	Rae	Ban Rae	<u>1</u>	P.A.1
			Total	5 sites

C. Soil Reclamment Trial

1. Rice straw Incorporation Trial

- Phanna Nikom	Wang Yang	Wang Yong	1*	P.A.3
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2. Soil Amendments Trial (Fertilizer, Lime, Farm Yard Manure)

- Phanna Nikom	Wang Yang	Ban Piey	1*	P.A.3
			Total	2 sites

* P.A. = Pilot Area (Grand Total 17 sites)

4. Nakhon Phanom Horticulture Experiment Station and Huey Si Thon Pilot farm Project, Horticulture Division (with help from Tha Phra on fruit trees)

- Varietal and Yield Tests on vegetable crops
Total area of 5 Rai, with 4 to 5 sites.
- Seed multiplication work on vegetable crops, particularly chilli Total area - 50 Rai
- Environmental test on same fruit trees.
Fruit trees like Mango, Cashew-nut, Tamerine, and Cocoanuts. Total area - 10 sites.

5. Sakon Nakhon Sericulture Experiment Station, Sericulture Division

- Multiplication of Mulberry Plants
24 sites in Upstream area in 4 Rai each
- Silk-worm egg production
Aimed at 10,000 female reproductive Biolitine silk worms.

- Demonstration on promining Mulberry variety
Area of 2 Rai at 1 site
- Sericulture Training Center course
A one-month course for 24 persons (from
Upstream area) who are planning to be engaged
in Sericulture.

6. Entomology and Ecology Division and Plant Pathology
Division

- Study and survey diseases and pests in the
area.

SUMMARY 1980 (BAHT)

(Department of Agriculture)

The Summary Budget for 1980 would be:

	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Land and Construction</u>	Nil	Nil	Nil
<u>Expendable Supplies</u>	50,000	50,000	100,000
<u>Equipment</u>	Nil	96,000	96,000
<u>Temporary Wages and Salaries</u>	101,945	197,680	299,625
<u>Travel, Per Diem, and Other Expenses</u>	<u>100,000</u>	<u>134,800</u>	<u>234,800</u>
Totals	251,945	478,480	730,425

DEPARTMENT OF AGRICULTURE

FINANCIAL PLAN

(BAHT)

CLASS AND ITEM	FY 1980		
	<u>AID</u>	<u>RTG</u>	<u>TOTAL</u>
<u>Land and Construction</u>	Nil	Nil	Nil
<u>Expendable Supplies</u>			
- Fertilizer, Insecticides and otehrs	20,000	20,000	40,000
- Office Supplies, postage	10,000	10,000	20,000
- Gasoline, oil, and lubrication	20,000	20,000	40,000
Sub-total	50,000	50,000	100,000
<u>Equipment</u>	Nil	96,000	96,000
Sub-total	Nil	96,000	96,000
<u>Temporary Wages & Salaries</u>			
- 6 contract employees @ Baht 900/mos. for 3 mos. Baht 36,200			
6 contract employees @ Baht 1,080/mo. for 9 mos. Baht 66,320	101,945		
- Permanent DOA staff assigned to project area	_____	197,680	299,625
Sub-total	101,945	197,680	299,625
<u>Travel, Lodging, Per Diem</u>			
- C-4,C-5,C-6,C-7 employees and contract employees 100 Days for 10 persons 100 x 100 x 10 = Baht 100,000	100,000		
- Same as above for 134 Days	_____	134,800	234,800
Sub-total	100,000	134,800	234,000

ANNEX C-4NON-FORMAL EDUCATION DEPARTMENT

(February 1, 1980 to September 30, 1980)

I. Lam Nam Oon Area Work Plan1. Target:

The proposed focus of activities in the Lam Nam Oon area will be addressed to the targets comprising Tambols Pok Noi, Wang Yang, Rai, Phanna, Chan Ming, Hi Yong, and Pilot Areas 1 and 3.

2. Strategy:

Attention to the target area will be based on a integrated planning strategy which revolves around the axis of year-round water supply for agricultural production. This strategy asserts that the Lam Nam Oon area has special water management, cropping, marketing, and cultivation needs which each participating Thai government agency must deal with appropriately in consonance with their own general policies and modes of operation.

3. Target Area Purpose:

The target area will be an initial testing and training location. In it, all participating agencies will work together in order to define problems, their solutions, and means by which each agency can most efficiently speed the necessary improvements in skills, knowledge, and participation among farmers, local leaders, and officials.

4. Basic Program:

The Non-Formal Education Department's basic program in the target area will be built around its regular emphasis upon: Interest Group Training; Mobile Adult

Occupational Courses; Functional Literacy Training; Mobile Library Operations; and Information Dissemination through various means including use of a Audio-Visual Mass Media Unit.

5. Replication:

In total, the Basic Program of the Non-Formal Education Department will affect about 30,000 people residing in the target area. That area contains a population of 39,000 individuals.

Only through gradually adjusting the intrinsic content of the Basic Program will it be possible to evolve a Non-Formal Education training and information program that is fully supportive of the Lam Nam Oon area. Therefore, it is planned that the content of some of the activities in the Basic Program will be adjusted, gradually, to conform to the agricultural extension, water management, cropping, marketing, and cultivation special knowledge and skills needs of the Lam Nam Oon area. This will be accomplished through test and observation in the target area and in cooperation with other participating agencies and technical advisory services. Ultimately, perhaps by Fiscal Year 1981, these changes will be incorporated in the Basic Program and replicated widely throughout the Lam Nam Oon area.

6. Target Area Basic Program operations for 8-month interval, 1980:

a. Interest-groups:

30 hours of free training for 105 Interest-groups in the 50 villages of the target area. Materials are provided by each Interest-Group which comprises 15 to 20 individuals. Training concerns such

subjects as engine repair; radio repair; tailoring; dress-making, sewing, mushroom growing, food preparation, etc.

b. Adult Occupational Courses:

900 days of courses at the rate of 100 to 300 hours per course. Materials are provided by the Department of Non-formal Education and fees are charged per student at rates varying between Baht 30 and Baht 50 per course. Instruction is given by skilled teachers working temporarily in village training quarters. Courses comprise more advanced treatment of such matters as engine repair, carpentry, tailoring, electrical repair, etc.

- c. 40 hours of training for 5 Interest-Groups who are taught skills directly related to some needs generated by the integrated planning strategy for the Lam Nam Oon area. These might include such matters as: the construction and installation of water measuring orifices in farmer fields, repair of ditch/dike structures, and the construction of storage (grain or other products) structures at Tambol levels.
- d. Special development of Adult Occupational Course curricula specific to the trades and skills needs of the target area. Design and test of at least 3 courses geared to the area needs, and with possible location of training at the Integrated Training Center in tambol Hi Yong.
- e. 1,000 hours of Functional Literacy training or 200 hours per village among 5 of the 50 villages in the target area. Content of the training to be adjusted to the information and knowledge needs of people working in the Lam Nam Oon area.

- f. Operation of 3 Mobile Library units in the area at the rate of 60 days/unit, with a target of 5,400 people provided with borrowed books and other reading materials during the year. Library materials to be oriented, increasingly, towards information and special skills needs of people working in the Lam Nam Oon area.
- g. Development of special messages for the area population concerning such subjects as Land Consolidation, land levelling, crops, water management, markets, credit, cultivation, and soils amendments practices. Delivery of these messages through various means including the operation of a audio-visual mass media unit in the area at the rate of 60 days/unit.
- h. Develop and test Involvement, Utilization, and Implementation Indicators including systems to record same.

Non-Formal Education
Financial Plan

(Baht)

(By Quarter)

	2nd		3rd		4th		Total <u>AID</u>	Total <u>RTG</u>	Combined <u>Total</u>
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>			
<u>Totals</u>									
- Equipment	299,100						299,100		299,100
- Supplies	12,720	4,600	18,180	6,900	18,180	6,900	49,080	18,400	69,480
- Operating Expenses for Local Resource and Supervisory Personnel	27,440	84,840	38,660	124,760	41,260	127,060	107,360	336,660	444,020
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Sub-totals	339,260	89,440	56,840	131,660	59,440	133,960	455,540	355,060	810,600

Non-Formal Education

Financial Plan

(Baht)

	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total AID</u>	<u>Total RTG</u>	<u>Combined Total</u>
	2nd		3rd		4th				
<u>Equipment</u>									
For Mobile Unit Training									
- Sewing Machines 30 each	105,000						105,000		105,000
- Used Motorcycle 20 each	30,000						30,000		30,000
- Barber Chair 10 each	20,000						20,000		20,000
- Haircut Equpt. 10 each	3,500						3,500		3,500
- Generator 1 each	25,000						25,000		25,000
- Movie Projector 1 each	35,000						35,000		35,000
- Overhead Projector 1 each	14,000						14,000		14,000
- Slide Projector 1 each	7,000						7,000		7,000
- Amplifier & Acces. 1 each	10,000						10,000		10,000
- Camera & Flash 1 each	8,000						8,000		8,000
- Typewriter 1 each	10,000						10,000		10,000

Non-Formal Education

Financial Plan

(Baht)

	<u>2nd</u>		<u>3rd</u>		<u>4th</u>		<u>Total</u>	<u>Total</u>	<u>Combined</u>
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Equipment</u>									
- Duplicator, hand & electric operate 1 each	26,000						26,000		26,000
- Paper Guillotine 1 each	5,000						5,000		5,000
- Master Stapler 1 each	<u>600</u>						<u>600</u>		<u>600</u>
Sub-total	299,100						299,100		299,100
<u>Supplies</u>									
- Office Stationary	600	600	900	900	900	900	2,400	2,400	4,800
- Gasoline, & lube.	<u>12,120</u>	<u>4,000</u>	<u>17,280</u>	<u>6,000</u>	<u>17,280</u>	<u>6,000</u>	<u>46,680</u>	<u>16,000</u>	<u>62,680</u>
Sub-total	12,720	4,600	18,180	6,900	18,180	6,900	49,080	18,400	67,480

Non-Formal Education

Financial Plan

(Baht)

	2nd		3rd		4th		Total AID	Total RTG	Cmbined Total
	AID	RTG	AID	RTG	AID	RTG			
<u>Operating Expenses for Local Resource and supervisory Personnel</u>									
- Expenses for local technical resource personnel teaching Interest-Groups at Baht 30/hr. x 3,150 hrs.	11,700	11,700	17,550	17,550	18,000	18,000	47,250	47,250	94,500
- Expenses for local technical resource personnel teaching functional Literacy courses at Baht 30/ hr. x 1,000 hrs.	5,000	5,000	5,000	5,000	5,000	5,000	15,000	15,000	30,000
- Expenses for 20 Voluntary (Village) Teachers - paid by qualification: Muang 5 x 7,400 x 8 Phanna 5 x 7,140 x 8 Phanna 5 x 7,065 x 8 Ph.Kon 5 x 7,065 x 8		57,340		86,010		86,010		229,360	229,360
- Supervisory expenses for 3 Amphur Ed.Of. & 1 Changwat Ed.Sup. @ Baht 35/day x 24 days	840		1,260		1,260		3,360		3,360

Non-Formal Education

Financial Plan

(Baht)

	2nd		3rd		4th		Total	Total	Combined
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Operating Expenses</u> <u>for Local Resource</u> <u>and Supervisory</u> <u>Personnel (Cont'd)</u>									
- Supervisory Stipend for 3 Amphur Ed.Of. and 1 Changwat Ed. Supervisor Baht 25/day x 24 days		600		900		900		2,400	2,400
- Operational Expenses for 6 Instructors in Adult Occupational Work, Baht 40/day x 150	4,320	4,320	6,480	6,480	7,200	7,200	18,000	18,000	36,000
- Operational Expenses 1 Team Leader @ Baht 120/day x 60 days	960	720	1,440	1,080	1,560	1,440	3,960	3,240	7,200
- Operational Expenses 5 Life-Long Ed.Of. @ Baht 100/day x 50 x 5	3,000	3,000	4,500	4,500	5,000	5,000	12,500	12,500	25,000
- Operational Expenses for Audio-Visual Unit Staff									
1 C-5 Baht 60/day x 60	360	480	540	720	720	780	1,620	1,980	3,600
1 C-4 Baht 50/day x 60	300	400	450	600	600	650	1,350	1,650	3,000
1 C-2 Baht 40/day x 60	240	320	360	480	480	520	1,080	1,320	2,400
1 C-1 Baht 30/day x 60	180	240	270	360	360	390	810	990	1,800

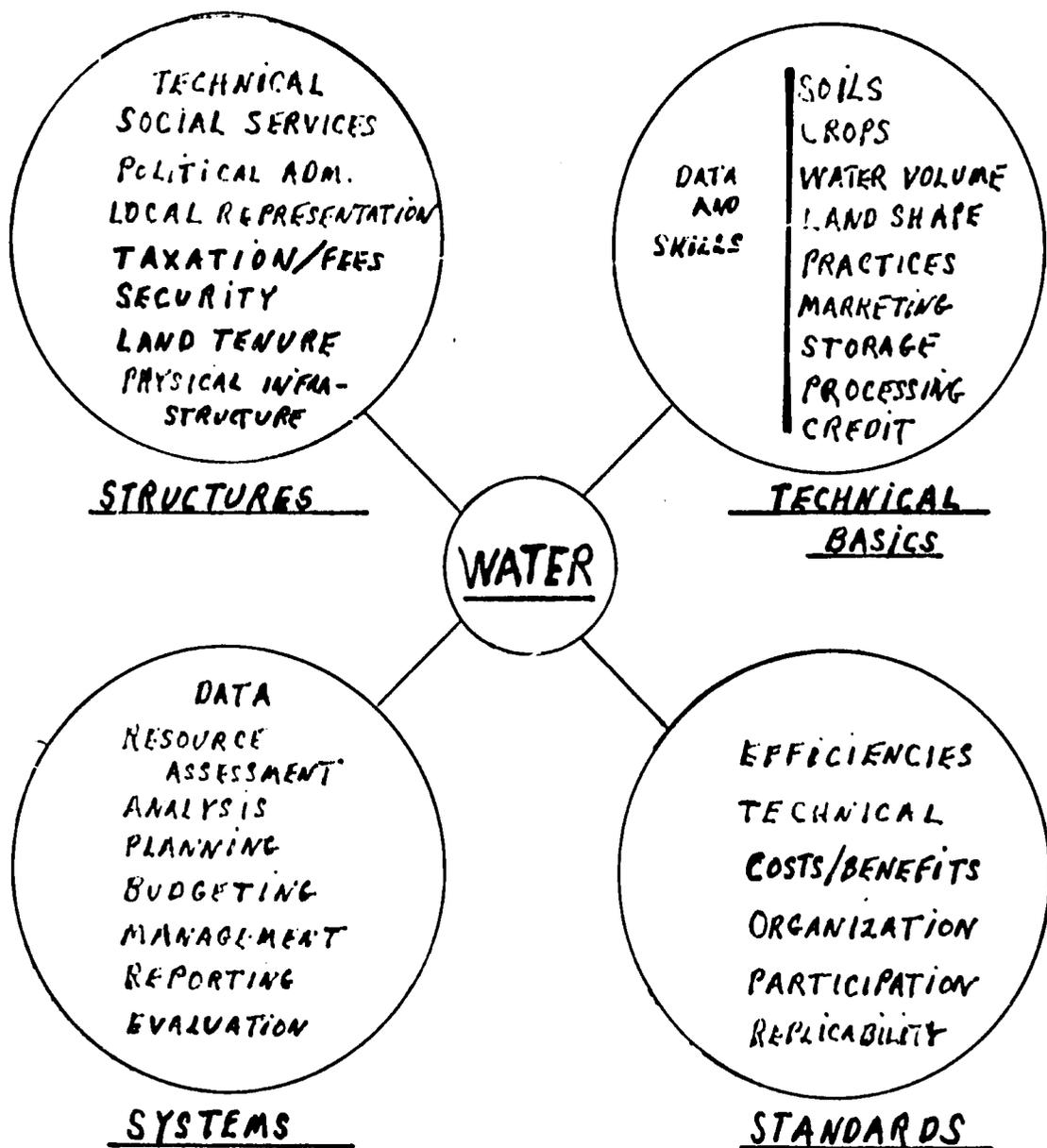
Non-Formal Education
Financial Plan
(Baht)

	<u>2nd</u>		<u>3rd</u>		<u>4th</u>		<u>Total</u>	<u>Total</u>	<u>Combined</u>
	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>AID</u>	<u>RTG</u>	<u>Total</u>
<u>Operating Expenses</u> <u>for Local Resource</u> <u>and Supervisory</u> <u>Personnel (Cont'd)</u>									
Per Diem for 3 Operators in Mobile Library Unit @ Baht 30/day x 60	<u>540</u>	<u>720</u>	<u>810</u>	<u>1,080</u>	<u>1,080</u>	<u>1,170</u>	<u>1,430</u>	<u>2,970</u>	<u>5,400</u>
Sub-Totals	27,440	84,840	38,660	124,760	41,260	127,060	107,360	336,660	444,020

ANNEX D

SCHEMMATIC

Irrigation Area Integration and Rural Development
Outline



Chapter II

Progress of Project Work

- 2.1 During the quarter under review the Louis Berger International, Inc. advisory team adopted a 4-month planning strategy. This was outlined in detail in the December, 1979 Monthly Report.
- 2.2 The contents of the 4-month planning strategy will change as the Team obtains additional experience; but at the end of this reporting quarter the list of assignments made in December, 1979 remained substantially unchanged. Progress on each Task is outlined below.

2.3 Engineering:

ACTION

Planning and Phasing

- 1) Establish a Base Line: - Some initial work completed during December, and January; but much more extensive and detailed review of data by RID at Bangkok, with Berger engineers, is required in order to properly complete this task.
- 2) Develop phased targets, work schedules, budgets for FY 80 and FY 81, etc. - Same remark applies as in (1) above; but, in this case, the Berger Team has developed some preliminary views calling for a slower pace of future construction.

These preliminary views are expressed in a short paper, attached Annex A, developed by Mr. Wm. Bell.

- 3) Develop contract documents, specifications, etc. in consonance with targets. - No action.

On-Farm Irrigation

- 1) Install water measuring system at farm levels. - Ten field locations were identified for the installation of submerged orifices that will measure water use.

A prototype was designed, made, and installed at Pilot Area 3. RID shop fabrication of the remaining nine (9) submerged orifices has been delayed pending resolution of the question of cost for each orifice. Average cost is Baht 400/orifice. At end of quarter, this matter was drawn to the attention of the Field Director. Meanwhile, with the exception of the single installed orifice, further measurements are delayed.

Engineering (Cont'd)ACTION

- 2) Design intensive and extensive on-farm water systems. - No action on this Task. A pertinent condition concerns the need for field-based design operations by RID. A preliminary paper, Annex B, by Mr. Wm. C. Bell discusses this entire subject and offers some preliminary recommendations.
- 3) Become familiar with farmer water use behavior in Chaks, etc. - Subject discussed by Bell with the Rural Development and Agricultural Extension components of the Berger Team (Hill, Kosin, Chainarong) and will become a part of their field work. Bell visited 9 farms and made his own observations.
- 4) Estimate irrigation water requirements for specific crops and soils. - Discussions were held with Asian Institute of Technology personnel in regard to water use studies. Khun Prida, of AIT, visited LNO on Jan. 28, 1980 at the invitation of the Team. In cooperation with RID he plans to assist in water/crop measurements on several individual plots. The first plan was to conduct this study on one sub-lateral system in Pilot Area 3. However, it was found that only about 25% of the area was to be planted, thus the scope of the study would be very small.
- It was decided that a more intensive water balance study should be planned and carried out next Dry Season (1980-81). AIT is willing to participate in this, if funds are available. Terms of Reference have been requested from AIT. Once these are in hand, efforts can be addressed to finding the necessary funds, to finance the study.
- See, also, Item (12) under Agriculture below.
- 5) Develop reasonable estimates on water supply per farm, etc. - No action
- 6) Introduce rotational irrigation practices, etc. - A guide for field soil moisture determination has been prepared and is now being translated into Thai. It is hoped that with some training and practical experience farmers as well as others will have a good idea of when to irrigate.

Engineering (Cont'd)ACTION

There appears to be a great need for creation of a meteorological station at Pilot Area 3. This would include full-time assignment of a Thai hydrologist/meteorologist. The need and requirement is explained in the attached, Annex C, by Wm. C. Bell.

Land Levelling:

- | | |
|---|--|
| 1) Review RID and farmer experience to date on Pilot Areas 1 and 3 | - Some preliminary observation work started, particularly in Pilot Area 3. |
| 2) Review effects of present RID land levelling techniques in Pilot Areas 1 and 3 | - Some preliminary observation work started, particularly in Pilot Area 3. |
| 3) Develop performance criteria for future land levelling. | - Reviewed with the Field Director a temporary design modification in Pilot Area 3. This was necessary due to under-estimation of full requirements. Thus, budget and equipment time was not sufficient. |
| 4) Develop procedures for design, survey, etc. | - No action |
| 5) Develop procedures for letting land levelling contracts. | - No action |
| 6) Develop procedures and systems of recording data on land levelling. | - Some preliminary review of existing records. |

Operations and Maintenance:

- | | |
|--|---|
| 1) Develop guidelines for O & M practices on main canals, laterals, and ditch/dikes | - Survey of existing system scheduled for February-March, 1980. |
| 2) Develop guidelines for O & M below Turnouts by farmers, etc. | - No action |
| 3) Become familiar with farmer water use, etc. | - Same Action as under (3) above in On-Farm Irrigation. |
| 4) Coordinate with II Rural Development, etc. in order to examine feasibility of developing tertiary canal farmer organizations. | - No action |
| 5) Develop organizational and staffing structure for operations, etc. | - Initial discussions held with RID O & M staff at Lam Nam Oon, and further discussions on this subject scheduled with RID at Bangkok. |
| 6) Develop costing and budgeting systems for O & M. | - No action |
| 7) Advise on materials standards and types of equipment in O & M. | - AID list of prices and equipment for RID O & M under the AID Loan was finalized. Submitted to AID for procurement action on January 31, 1980. |

Drainage:

- | | |
|--|--|
| 1) Determine detailed drainage requirements. | - No action |
| 2) Identify the priority of areas in most urgent need of drainage. | - Reviewed with Field Director current project policy to couple drainage improvement to Land Consolidation operations. |
| 3) Develop criteria for drainage operations. | - See (2) above, otherwise - no action. |
| 4) Assist in the design of specific drainage activities. | - No action |
| 5) Develop and apply criteria for selection and guidance of contractor's, etc. | - No action |

Feeder Road Development and Maint.ACTION

- 1) Develop Baseline - Same as Planning and Phasing (1) above.
- 2) Continue construction of feeder roads, etc. - 54.00 Km. of roads scheduled for completion in 1981.
- 3) Develop contract documents, specifications, etc. - RID already operating a system which appears to be performing satisfactorily.

Preparation and Use of Aerial Photos, Topographic, and Cadastral Maps

- 1) Development of land levelling and land consolidation maps. - Matter still under investigation at Bangkok.
- 2) Investigation of whether land levelling mapping can be computerised. - Investigation by Mr. Bell continuing.
- 3) Investigate feasibility of ultimately providing all farmers within Land Consolidation area and some Ditch/Dike area with individual farm maps. - No action
- 4) Seek to provide all LNO project personnel with detailed land suitability maps. - RID-Bangkok completing duplication of 30 Land Suitability maps (color-coded) at end of February, 1980.

Training

- 1) Define functions and techniques which require special training of RID and other project personnel, related to water use, management, etc. - No action
- 2) Define types of training required - No action
- 3) Training of Farmers in matters concerning importance, use, control, rotating, etc. of water. - No action

Management and Organization:

- 1) Use the AID-related Work Planning and Financial Planning exercises as the initial means to: a) Develop systems for integrated Planning b) Install Integrated Implementation; c) Develop periodic reporting; d) Involve local participation in planning/implementation. - Development of an Irrigation Area Integration and Rural Development Outline, with a water-oriented strategy axis, and a Target Area emphasis.

ACTION

- 2) Development of Implementation, Utilization, and Involvement Indicators. No action.
- 3) Study Work Loads, assignments, span-of-control, of project personnel in order to develop recommendations on improved staffing, etc. - See Annex B - with reference to need for field-based design Operations by RID.
- 4) Assist RID in developing budget planning and costing systems which add to the efficiency of irrigation operations. - No action

Evaluation:

- 1) Refer to the 7 Tasks outlined in III EVALUATION section. - No action
- 2) Develop evaluation systems within engineering portions of the LNO project. - No action

2.4 Rural Development

- 1) Develop a AID-related Work Plan and a Financial Plan. - See Section 3, Chapter I, and the accompanying Annex C to that Chapter.
- 2) Begin Preliminary On-farm water use Measurements and related tests in cooperation with DOAE. - Hill-Kosin-Chainarong Team now working with DOAE on up to 10 Farms and Plots in Tambols Hi Yong, Chan Ming, Phanna, Wang Yang, and Rai - also in Pilot Areas 1 and 3. See item (1) in section 2 of Chapter I of this Report, and the accompanying Annex B - attached to that Chapter.
- 3) Begin process of familiarizing Team Leaders with importance of water measures, and AREA CROPPING PLAN NUMBER 6. Reproduce Chapters 4,5, and 6 of the ECI Report of Jan. 1977 and accompany with short explanation in the Thai language. - A summary and guide for general use of three chapters from ECI's Report is completed. This has been translated into Thai. Reproduction is now taking place, when available, this material will be used to assist RID, DOAE, and DOA personnel in understanding soils-crops-water relationships.

<u>Rural Development</u>	<u>ACTION</u>
4) Begin process of familiarizing Team Leaders and project personnel with how the Land Suitability Maps relates to <u>AREA CROPPING PLAN NUMBER 6</u> and the uses to be made of same.	- As noted under 2.3 above, Engineering, Preparation and Use of Aerial Photos, Topographic, and Cadastral Maps, Item 4, a total of 30 color-coded copies of this map are being completed by RID-Bangkok.
5) Soils Scientist Assignment	- Dr. Santhad contacted and is not yet available. Terms of Reference not yet drafted.
6) Review contents of 3), 4) and 5) above with Field Director and Team Leaders in March, 1980.	- Probable delay on Dr. Santhad contract may delay this meeting date.
7) <u>Liming Test Program</u> a) Following review by Dr. Santhad, develop with DOA and DOAE a Liming Test Program for the 1980 Wet Season. b) Develop a larger Liming Test Program for the 1980-81 Dry Season.	- Sorenson Report (preliminary) on Liming for LNO area located and reviewed. Now planning to survey source of lime at 80 kms. west of Udorn. No other action, as yet, on a) and b).
8) Investigate Thai experience in growing irrigated crops (and associated research) in the Kalsin and Khonkaen areas.	- Some research data now located and under review. Tentative plans developed for one-week visit to area by Hill, Kosin, Chainarong team in late February, 1980.
9) Observe RID Land Consolidation work in Chinat, Pitsanalok, and elsewhere.	- Initial Coles-Bell visit to Chinat tentatively planned for second week of February.
10) Local Agricultural Problem Inventorying and Planning.	- Hill, Kosin, Chainarong team developing close working relationship with Kaset Amphurs and Kaset Tambols in target area, preparatory to carrying forward various activities including inventorying and planning.
11) Review progress of RID preparations for Land Consolidation in the proposed 1980-81 area. Begin to assist DOA and DOAE to plan applied research in the newly consolidated area, etc.	- No major action as yet; but preliminary discussions have been initiated with the Technical Services Division (Bangkok) DOA looking towards the possible design and operation of some crop constraint research in the area during the 1980-81 Dry Season.
12) Develop future DOA crop research and DOAE crop demonstration plans for 1981 and 1982 in the Ditch/Dike areas (and Land Consolidation) etc.	- No action on this.

Rural Development (Cont'd)ACTION

- 13) Test and develop water measurement and water management practices at the farm level. Train RID, DOAE, DOA, CD, and Non-Formal Education personnel in these matters.
- 14) Based on data drawn from Pilot Areas 1 and 3 as well as foregoing operations begin work with CD, Non-Formal Education, RID, DOA, and DOAE to develop exhibits in the Thai language, charts, slides, etc. to support arguments for repetitive presentation to farmers about Land Consolidation, cropping, water practices.
- 15) Provide advice and guidance on planned coordination to CD, DOAE, and Non-Formal Education concerning promotion/demonstration of High Value Crops.
- 16) Management and Evaluation
- Selection of the Target Area has marked completion of the first major step. However, no further action on other aspects - as yet.
- Selection of the Target Area first major step. Also, Work Plans of Non-Formal Education and CD - in particular - have been shifted towards emphasis upon creation of Integrated Training Center at Tambol Hi Yong by CD and development of special messages by Non-Formal Education. Implementation of many of these matters must take place in next few months.
- Chainarong assigned this task. Meanwhile DOAE and CD are proceeding with existing plans for work on this subject during this Dry Season.
- See relevant section below for whole of Section II.

Marketing and Credit

- 1) General Inventory. Develop a general picture of marketing and credit systems operational in the areas to be affected by Land Consolidation and Ditch/Dike improvement during the next three years. Assess potentials, constraints, new systems.
- 2) Market Survey to be done by K.U. and DAE.
- 3) AREA CROPPING PLAN NUMBER 6 and potential markets/credit. Constant identification of potential markets and sources of credit.
- Chainarong assigned preliminary work on this task. First evidence about Adams Tobacco Co. operations in area now being assembled. Plan to visit Adams outside Khon Kaen during Khon Kaen - Kalasin visit in late February.
- Initial survey plan for 1980-81 reviewed by Team during January, 1980 and rejected as now drafted. Team must come forward with a counter-proposal during February, if possible.
- Adams Tobacco Co. explorations mentioned above. Also investigating possibility of utilizing ARD Amphur Farm Group credit sources in the area.

Rural Development (Cont'd)ACTION

- 4) Management and Evaluation - See relevant section below for whole of Section II.

Fisheries:

- 1) Develop a AID-related Work Plan and a Financial Plan. - See Section 3, Chapter I, of this document and the accompanying Annex C to that Chapter.
- 2) Fisheries Specialist Assignment. - No action as yet.
- 3) Investigate investment opportunities for fresh water fish culture and reservoir fish production. - No action as yet.
- 4) Investigate feasibility of coordinating RID land levelling with fish pond construction and enlargement in the and consolidation areas. - New 1980 Work Plan for Fisheries contains this emphasis and RID has indicated willingness to introduce matter into design of Land Consolidation areas.
- 5) Investigate feasibility of testing aquatic plant Azolla Pinata in Land Consolidation area pond or ponds. - Work Plans of DOA and Fisheries both contain this emphasis and RID has indicated willingness to introduce matter into design of Land Consolidation areas.
- 6) Management and Evaluation - See relevant section below for whole of Section II.

Organizational Development

- 1) Develop a AID-related Work Plan and Financial Plan for Community Development - See Section 3, Chapter I, of this document and the accompanying Annex C to that Chapter.
- 2) Develop a general inventory for the kinds of organization's that are operational in the area to be served by Land Consolidation and new Ditch/Dike installations. - CD has some material on this; but, as yet, the Team has not begun to focus on this subject in terms of farmer-related or farmer-service organizations. It has completed a survey of local officials in the Target Area. See Annex D, as completed by Khun Chainarong Butrobol.
- 3) Observe behavior of farmers in Pilot Areas 1 and 3 along ditch/dikes during current irrigation period. - Hill, Kosin, Chainarong team carrying out these observations while working with DOAE on farmer demonstration plots.

Organizational DevelopmentACTION

- 4) Develop a plan or plans for how various organizations operating in the area under 2) above can begin to educate, inform, train farmers, etc. - No action for local organizations; but Work Plan for CD and Non-Formal Education contains emphasis upon creation of an Integrated Training Center to be operated by CD and special development of training curricula by CD and Non-Formal Education in the Target Area.
- 5) Management and Evaluation - See relevant section below for whole of Section II.

Occupational Diversification

- 1) Develop a AID-related Work Plan and Financial Plan for Department of Non-Formal Education - See Section 3, Chapter 1, of this document and the accompanying Annex C to that Chapter.
- 2) Provide advice and guidance on planned coordination to CD, DOAE, and Non-Formal Education on promotion/demonstration of High Value Crops. - Chainarong assigned this task. Meanwhile DOAE and CD are proceeding with existing plans for work on this subject during this Dry Season.
- 3) Supplementary or new income activities for areas affected by Land Consolidation and new ditch/dike installations during next three years. Assist Life-Long Education Center at Sakon Nakhon in these matters, as well as other agencies. - No significant action. Initial discussions with Team Leader for Non-Formal Education Department seems to indicate that all long-term training must be based on elaborate facilities to be constructed at Changwat Sakon Nakhon. This does not appear to meet the special long-term training needs of the Lam Nam Oon area. No exploration, as yet, of other possibilities.
- 4) Sericulture, in resettlement area upstream from dam. Examine current efforts of Department of Public Welfare the Sericulture Section, DOA, and water supply activities of RID related thereto. - Only one short visit to resettlement area by Team. Meanwhile, RID has shut down water pumping operations because of lack of diesel oil for pumps - and also because system will shift to electrical-powered pumps by June, 1980.
- 5) Management and Evaluation - See relevant section below for whole of Section II.

Expanded Social Services

- 1) Discuss with Department of Health the implications of an expanded water and fish supply program on area - for further spreading liver fluke disease. See if control and training programs can be planned. - No action

Expanded Social Services (Cont'd)ACTION

- 2) Investigate the possibilities of involving private, voluntary, organizations (NVO's) with Health, CD, Family Planning, Education, etc. - No action
- 3) Management and Evaluation - See relevant section below for whole of Section II.

Training:

- 1) Begin to assist CD develop the special curricula for it's Integrated Training Center at Hi Yong. - Other than obtaining emphasis upon this in the new CD Work Plan - no specific actions as yet.
- 2) Begin to assist Non-Formal Education to develop special curricula for field-based Interest-Group and Adult Occupational Courses in Target Area. - Other than obtaining emphasis upon this in the new Non-Formal Education Work-Plan - no specific actions as yet.
- 3) Management and Evaluation - See relevant section below for whole of Section II.

Management and Organization:

- 1) Use the AID-related Work Planning and Financial Planning exercises as the initial means to: a) Develop systems for Integrated Planning b) Install Integrated Implementation; c) Develop periodic reporting; d) Involve local participation in planning/implementation. - Development of an Irrigation Area Integration and Rural Development Outline, with a water-oriented strategy axis, and a Target area emphasis. This now done in the 1980 new Work Plans for CD, DOA, Non-Formal Education, and Fisheries. DOAE still under review.
- 2) Development of Implementation, Utilization, and Involvement Indicators - Discussed with CD, Fisheries, DOA, and Non-Formal Education; but no detailed work begun.

Hill-Kosin-Chainarong team beginning to develop some farm record-keeping which may be the basis for certain types of Indicators.
- 3) Study work loads, assignments, and span-of-control of Field Director, Team Leaders, and project personnel in order to develop suggestions about improved staffing, assignments, and organization. - Only study so far concerns DOAE staffing and assignment systems for Kaset Tambols. So far, only initial impressions in hand and no organized facts or recommendations presented by the Team.

No similar preliminary study or impressions for other participating organizations.

2.5 EvaluationACTION

- | | |
|--|--|
| 1) Establish an Information Baseline for Economic, Social, Technical, Administrative, and Management aspects of the LNO project. | - Very fragmentary effort so far by entire Team, on this subject. There is need to set up internal Team systems which will help to generate this kind of information in Engineering and Rural development. |
| 2) Inventory existing information/reporting systems within each participating agency - with particular reference to operations within new Land Consolidation and Ditch/Dike areas. | - Action is with Chainarong. So far, the time-consuming start with DOAE in the field impedes development of data about other agencies concerning this subject. |
| 3) Monitoring:
Await outcome of first four months of experience before beginning to design/test various monitoring/analysis/feedback alternative systems. | - Slow development of 1) and 2) above suggests that unless action is speeded soon on this, the Team will not be in a position at the end of the first four months to evaluate outcome of experience. |
| 4) Diagnosis and Planning Modification. Same as 3) above. | - Situation is same as 3) above. |
| 5) Impact:
Same as 3) above. | - Situation is same as 3) above. |
| 6) Involvement of Target Populations: Study how actual and potential beneficiaries can be identified and associated and associated with planning, implementation, and evaluation. | - No Team action on this; and it appears that participating agencies are not now addressing this problem in significant detail. This appears to be a matter for priority remedial action. |
| 7) Training:
Limit training development, during first four months, (in matters concerning Evaluation) to minimums required in order to carry out studies and design tests as well as implement tests on a modest scale. | - No action |

ANNEX AGeneral Observations on RID Planning at LNO

At present RID's goal is to complete design and construction of 185,800 rai of ditch and dike and land consolidation by 1984, with about 13,500 rai of land consolidation and about 26,000 rai of Ditch/Dike in 80-81 construction season. There is no reason to believe that given sufficient financial and manning resources this cannot be achieved. There is a need to develop uniform criteria for both systems in the next few months. With help from the consultants this can be done.

However, there is a need to argue that RID should consider a somewhat slower pace of construction in the remaining project area. Several points support this argument:

- a) Engineering-Related Research Results from the two pilot areas (1 & 3) are very limited at this time. Pilot area 2 (Ditch/Dike) will be completed during the 80-81 construction season. With the limited data now available from these pilot areas not much will be transferrable to the bulk of the project. One question has already been raised; which of the three levels of development, that's to be investigated in Pilot Area 2, should be designed for the 26,000 rai of Ditch/Dike to be constructed next year? With no data available from research on Ditch/Dikes this question is hard to answer.
- b) The shallow highly fragile soils of the LNO project area require careful handling to achieve a viable project. This relates to land levelling, O & M, crops, etc. Land levelling as now being done requires careful review very soon. This observation arises mainly because of what seems excessive cuts to achieve level (or near level) fields. What the consequences of this is in the long run is not known. To continue this practice over

the total land consolidation area may be counter-productive. The economics of land levelling to this extent is not presently known but one would suspect that it is not justified. Some sources feel the economics and ecological consequences of any land levelling is questionable.

- c) The need for proper water management at the farm level is very important for these types of soils. Up to this point little has been done in the way of measuring and managing water at the farm level. Committing the total project to present or assumed practices may be too optimistic.
- d) Introducing a whole new system of cropping plans and patterns requires a complete rethinking by the farmers. To achieve objectives of the project requires dry season cropping and HYV rice. These are not traditionally grown, to any extent, by local farmers. The technology to achieve this change means extensive retraining of the farmers. What difficulties may be encountered in doing this is not fully known. At any rate it will take some time to do.
- e) Establishing the infrastructure for farmers to operate and maintain a viable project takes time. Setting up organizations for O & M, marketing and credit takes several years to reach a level where farmers have confidence in their use. For a successful project this infrastructure has to function. This means training the farmers in their use and operation, to cooperate with other and have confidence in the whole system. From the standpoint of their present status this may well take some time to achieve.

These observations are not intended to convey a pessimistic view of the LNO project. There are some problems that should be considered very carefully in setting the pace of project development. Some or all of these may be critical to achieving a successful project. Therefore each should be carefully monitored in small areas before applying to the project as a whole. The physical and technical aspects of construction most likely can proceed at a rate much greater than the economic and management aspects. If this is true then there should be some tempering of the construction schedule relative to other aspects. It would seem that it is far better to develop at a rate that allows research and infrastructure to keep pace with construction than to have the majority of construction complete and find a need for change that may be difficult and costly (or impossible) to make.

The timetable for overall completion need not necessarily be extended by more than a year or so. As proposed now, the construction is more or less equally spaced out to be complete by 1984. Instead, construction could be "skewed" to later years of the project. In other words, in early years more emphasis should be placed on research and procedures for developing the infrastructure and later years in implementation. This gives time to assess and find solutions to technical problems and time to develop and "debug" infrastructure systems. These must be right for the project to be a success.

Wm. C. Bell

February, 1980

ANNEX BLam Nam Oon Design TeamProblem

As it is now understood the responsibility for design of the Lam Nam Oon project is with RID in Bangkok. This means all design, drawings, criteria setting etc. is conducted at Bangkok and sent to LNO. Some of the designers travel to the project site on occasion. Also there are one or two designers at the site. Experience to date indicates they have little responsibility or authority in design matters. To fully and effectively implement the duties of the consultant, as outlined in the contract, it is necessary that team members be closely associated with RID personnel on a day-to-day basis. With RID design in Bangkok and the consultants in LNO this contact is precluded.

Solution

It is suggested that the chiefs of design sections, with cooperation of the consultants, select a design team for the LNO project. It will be located at the project site. The team would be under direction of the RID Team Leader for all design, drawings, criteria, etc. for the LNO project. The consultants will work closely with this team. If there are questions or problems that can't be solved at the project level then with help from RID-Bangkok they can be resolved. They would also be guided by general policy from the RID Bangkok office. Team members should include designers for ditch and dike, land consolidation, and drainage. Others would include draftsmen, survey, land classification, etc.

Justification

From an engineering point of view there are several reasons for locating a design team at the project site:

- Designers must be thoroughly familiar with the project area. They must have easy access to field observation during design. If there is any questionable data or they can't clearly "see" the problem, designers can go to the place in question for on-the-spot checking. This assures a more likely right decision or designers can collect more information.

Also this helps keep a timely schedule and avoids unnecessary travel.

- Being on the site the designer can see the results of design being implemented. This gives a "feedback" on which improvements can be made that will result in a better design next time.
- It helps too to be in contact with the construction engineer who has to implement what has been designed. This will lead to improved communications (such as drawings) that in turn will insure that construction is properly and readily implemented.

It is sincerely felt that without a design team located at the project progress of the project, full use of the consultants and experience to be gained by RID personnel will be limited.

Wm. C. Bell
February, 1980

ANNEX C

Meteorological Station

One of the basic requirements for determining water use for irrigated crops is the data obtained from a good meteorological station. This information is used directly in the case of rainfall and indirectly in determining potential evapotranspiration which is one of the inputs required for determining irrigation requirements.

The project papers and LNO contract calls for meteorological data that is necessary in undertaking required water balance studies.

- Review of the present meteorological station at LNO shows it's in a bad state of repair and insufficient data kept. In my view, a met. Station should be installed at Pilot Area 3. Also it is suggested that the LNO project have no its staff a full time hydrologist/meteorologist to maintain accurate records, keep equipment in repair and carry out required studies. The preliminary list of duties that might be performed include:
 - Collect all rainfall data in and around the project area.
 - Be responsible for meteorological station; maintenance, recording data, analysis, etc.
 - Measure outflows from reservoir; main canals and LNO river below the dam.
 - Determine if there are significant differences in rainfall distribution over the project area.
 - Determine drainage flows from outside of project that may cross or enter project lands.

- Investigate possibility of rain gauges in LNO reservoir drainage basin to refine inflow measurements. This would eventually be included in computer program (with water use studies) to predict available water for the up coming irrigation season.

Wm. C. Bell
February, 1980

ANNEX DAmphur Phang Khone

1.	Nai Supot Chaichet	District officer
2.	Nai Tiang Po-armart	Assistant district office
3.	Nai Vinai Manakit	" " "
4.	Nai Chana Nomsuwan	" " "
5.	Nai Supol Lemarngkul	" " "
6.	Captain Umporn Tongta	" " "
7.	Sub-Lt. Sutoop Sudprakone	Conscription officer
8.	Nai Chalong Surisom	Agricultural officer
9.	Nai Chavee Promsorn	Communication officer
10.	Nai Reab Vonggalasin	Revenue officer
11.	Nai Precha Rojnavach	Domestic animal officer
12.	Nai Seree Pasane	Forestry officer
13.	Nai Suriya Kutako	Excise officer
14.	Nai Chaiwat Sukonrat	Education office
15.	Nai Sawasdi Wongpakum	School attendance officer
16.	Nai Prapun Ratnanikom	Co-operative officer
17.	Nai Chartchai Tungmalai	Land officer
18.	Nai Veera Sartsuwan	Public health officer
19.	Police Captain-Rumpung Dangbumroong	Chief Police Station

Agri-Tambol Officer-Nai Kovit Tung kaw

1. Tambol Hai Yong

Kamnan	-	Nai Chansri Pratarn
Hamlet 1	-	Nai Hom Srisoi
" 2	-	Nai Sophon Suwan Chairob
" 3	-	Nai Pet Munjit
" 4	-	Nai Par Tadii
" 5	-	Nai Loonlert Supso
" 6	-	Nai Nilim Onsuratoom
" 7	-	Nai Chansri Pratarn
" 8	-	Nai Tongmee Saiviboon
" 9	-	Nai Kean Heravan
" 10	-	Bau Sinka Martvach

Tambol Hai Yong (Cont'd)

Hamlet 11 - Nai Kumplang Srisoi
 " 12 - Nai Boonme Niyomsug

Agri. Tambol Officer. Nai Sutut Parnprasert

2. Tambol Rae

Kamnan - Nai Swarng Supso
 Hamlet 1 - Nai Swarng Supso
 " 2 - Nai Par Pontong
 " 3 - Nai Lar Hungtuan
 " 4 - Nai Kart Malitong
 " 5 - Nai Soi Yarngtisarn
 " 6 - Nai Prasong Kunakorn
 " 7 - Nai Nu Harmuan
 " 8 - Nai Nom Sonchaiya

Amphur Pannanikom
Village Headman and Village Chief
(Kumnun and Poo Yai Ban)

Agri-Tambol Officer - Nai Padungsil Pupayarng

1. Tambol Pannanikom

Kamnan	-	Nai Surima Chaisakorn
Assistant	-	Nai Poon Sirichai
Hamlet 1	-	Nai Marg Chatarug
" 2	-	Nai Puvii Kitchareon
" 3	-	Nai Boonyu Kuntpat
" 4	-	Nai Chansri Seehakom
" 5	-	Nai Kerng Ginarech
" 6	-	Nai Surima Chaisakorn
" 7	-	Nai Boontong Sriprom
" 8	-	Nai Varajit Kunpat
" 9	-	Nai Savai Tongpitug
" 10	-	Nai Rumphai Chaichompu

2. Tambol Rai

Kumnan	-	Nai Aroon Saka
Assistant	-	Nai Nurean Saka
Kamlet 1	-	Nai Kum Ruangswasdi
" 2	-	Nai Deo Karngtong
" 3	-	Nai Tongrin Varikid
" 4	-	Nai Home Nontivaj
" 5	-	Nai Chareon Chaichet
" 6	-	Nai Thon Vongsai
" 7	-	Nai Arroon Saka
" 8	-	Nai Ket Keawchalya
" 9	-	Nai Tep Karngtong
" 10	-	Nai Lue Chaichet
" 11	-	Nai Soonlai Inkumnoi
" 12	-	Nai Kasai Chaichet

Agri. Tambol Officer-Miss Arunee Chanpvayool

3. Tambol Wangyarn

Kamnan	-	Nai Sriton Fong-on
Assistnat	-	Nai Ton Suwan
Hamlet 1	-	Nai Karn Konpang
" 2	-	Nai Leelar Horatee
" 3	-	Nai Poonsavas Srikote
" 4	-	Nai Sauw Martrach
" 5	-	Nai Warn Suvart
" 6	-	Nai Sriton Fong-on

Agri. Tambol Officer - Miss Pongpit Kirdchantra

5. Tambol Poknoi

Kamnan	-	Nai Chai Intree
Assistant	-	Nai Boontung Narasarn
Hamlet 1	-	Nai Pin Vajeeting
" 2	-	Nai Boontai Seeharart
" 3	-	Nai Srifong Upprii
" 4	-	Nai Rueng Konpang
" 5	-	Nai Tong Putmart
" 6	-	Nai Tong Saraj
" 7	-	Nai Supan Kawdee

Agri. Tambol Officer - Nai Kumjud Suwansampan

6. Tambol Charnming

Kamnan	-	Nai Klung Tiptong
Assistant	-	Nai Chumrus Vanwart
Hamlet 1	-	Nai Klung Tiptong
" 2	-	Nai Boonlert Niket
" 3	-	Nai Tarw Sripimsarl
" 4	-	Nai Karai Tipvang
" 5	-	Nai Sosin Tongtirart
" 6	-	Nai Rat Chaira
" 7	-	Nai Buatong Buapit
" 8	-	Nai Prayoon Hunghuan

Tambol Charnqming (Cont'd)

Hamlet 9	-	Nai God Hunghuan
" 10	-	Nai Suay Intasey
" 11	-	Nai Naring Tongwongsa
" 12	-	Nai Prachern Potimol

Chainarong Butrabol

Chapter III

Status of Project-Related Organization and Operation

- 3.1 Mobilization of the Louis Berger International, Inc. Advisory Team began during this quarter. The status at the end of the Quarter appears on the attached, Chart A. That Chart also indicates, by implication, the specific time constraints affecting a number of important skills in the Team. In some cases (for example, agriculture extension) almost a third of the total advisory time available - has already been expended.

This situation signals need for an early review of the Team's time allotments to certain skills, so that appropriate and timely changes can soon be negotiated within the terms of the existing contract.

- 3.2 Essential Support Staff was employed by the Team during the quarter. They included: a administrative assistant/interpreter, three drivers, and a part-time translator at Lam Nam Oon, and a driver at Bangkok.
- 3.3 RID released all promised equipment (cars, etc.) to the Team during the quarter.
- 3.4 Continued uncertainty concerning how much time the Team Leader should spend in Bangkok, plus a delay in Berger occupancy of RID-offered office space at Bangkok had two consequences during the quarter.

First, since it seemed imprudent to employ a good permanent secretary and an accountant at Bangkok, full-time, pending settlement of the work locii issue, the Team Leader with some help from Thai staff employed under other Berger contracts performed and continues to perform those functions. Second, RID-Bangkok did offer office space to the Team; but the adverse internal funding situation confronted by the Team through all of December, 1979 and most of January 1980 did not permit the Team Leader to procure the equipment necessary to occupy the space. As the hesitation continued, RID-Bangkok made the proffered space available to other users. Currently, the Team's Bangkok base remains at the Berger main office - a half city away from the RID-Bangkok compound.

- 3.5 With much help from the Project Field Director, RID-Bangkok financial staff, and the East Orange headquarters of Louis Berger International, Inc. the long fiscal drought experienced by the Team during two-thirds of the quarter began to green slowly in the closing two weeks. The Initial Mobilization Payment is still being processed and reimbursement review systems are still being developed and tested; but substantial Berger Dollar and Baht advances have temporarily restored fiscal viability to the Team. As the Duke of Wellington observed after Waterloo "it was a damned close run thing". Now, all we have to do is to look for a Metternich to help us in the future!

- 3.6 The Project Field Director and AID/Bangkok, together with extensive financial help from the East Orange headquarters of Louis Berger International, Inc., began to solve the site housing furnishings problem towards the end of the quarter. Acquisitions are now taking place and the contract is being amended. All team site-situated staff plan to move their families to Lam Nam Oon by March 1, 1980.
- 3.7 The Team initiated detailed contact and discussion work with all site-situated responsible Thai staff during the quarter. This include the following key individuals:

Governor Saisit Phornkeo	
Field Project Director	- Roongrueng Chulajata
Assistant Field Project Director and Team Leader of CD	- Sansonthi Booyothayan
RID Team Leader	- Tang Damrongbul
Dept. of Ag. Extension Team Leader	- Niphan Prachantasen
Dept. of Agriculture Team Leader (Rice)	- Chalermkiet Saisoong
Team Leader (Upland)	- Pramern Veturai
Dept. of Fisheries Team Leader	- Khemchart Nimsomboon
Dept. of Non-Formal Education Team Leader	- Kosit Kosanasanti
Land Consolidation Office - Sakon Nakhon Team Leader	- Thongchai Thanyaharn
Dept. of Livestock Team Leader	- Kong Vichienpred
Dept. of Land Land Survey Office	- Prathom Thammavichit
Dept. Public Welfare Supervisor, resettlement Project	- Pang Seewabma

Subsequent reports will indicate the widening range of Team contacts both in the Lam Nam Oon area, at Bangkok, and in other parts of Thailand where experience may be relevant to Lam Nam Oon needs.

- 3.8 One of the most notable, and promising, aspects of this project appears to be the decentralised and flexible manner in which the participating agencies are allowing Team Leaders to exercise responsibility. Team Leaders seem to feel that they are obtaining good support from co-ordinators in Bangkok-based offices and senior officials who are on the project's National Coordinating Committee.

This productive atmosphere allows scope for administrative 'grass-roots' planning and implementation through the Team Leaders at Lam Nam Oon. This is happening already, and it can be further strengthened.

Such a development will be particularly important as a water-based strategy for agency participation on systems, standards, structures, and technical basics is planned and implemented. This will require a high degree of interaction and communication among Team Leaders, the advisory Team, and Team Leader agency principals at Bangkok.

During the next quarter, this entire matter will be a subject of growing concern and activity by the advisory Team.

3.9 Work intensified on the drafting and implementation of specific task protocols for various members of the Advisory Team. These now include:

- High Value Crops for the Area
- General Inventory of Marketing and Credit Systems in the Area
- Inventory of Administrative Establishment in the Area
- A Five-Year Data Base on Rai Cultivated during Dry Seasons
- A Review of Non-formal Education Curricula Content for Residents of the Area.

3.10 As mentioned elsewhere in this Report, discussions have been started with personnel of the Asian Institute of Technology (AIT) concerning their possible participation in future water measure studies. Additionally, discussions have been initiated with A.I.T. concerning possible utilization of their designs for ferro-concrete storage structures in the area. Additional Thai sources of appropriate technological assistance will be sought by the advisory Team in the coming months.

CHART A
MAN-MONTH SCHEDULE OF BERGER TEAM
(FY 1979-1980)

POSITION:	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	COMPLETED		REMAINING		TOTAL
													MM	%	MM	%	MM
<u>Expatriate</u>																	
Team Leader		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	5.5	34	98.5	36
Wtr. Mgmt. O&M Eng.			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	8.5	11	91.5	12
Systems/Cn-Farm Irr. Eng.		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3	7.5	37	92.5	40
Ag. Extension		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.5	25	4.5	75	6
Rural Develop.													0	0	6	100	6
Hydrology													0	0	1	100	1
Ag. Economist													0	0	3	100	3
Irr. Ag. Develop. Specl.													0	0	2	100	2
<u>Thai</u>																	
Ag. Extension/Agronomy		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	13.3	13	86.7	15
Rural Develop.		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	33.3	4	66.6	6
Soil Scientist													0	0	2	100	2
Farm Instit. Specl.													0	0	2	100	2
Irr. Ag. Develop. Specl.													0	0	2	100	2
Fisheries Specialist													0	0	2	100	2

----- COMPLETED
----- SCHEDULED

TOTALS

Expatriate Staff
Thai Staff

110 Man-Months
29 Man-Months

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