

PD-ABB-092  
66047

**PROJECT ASSISTANCE COMPLETION REPORT**

**Northeast Small-Scale Irrigation Project**

Project Number 493-0312

Loan Number 493-T-024

**Agricultural and Rural Development Division**

**USAID/Thailand**

**April 20, 1990**

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## ACRONYMS AND TERMS

AIT	Asian Institute of Technology
BAAC	Bank of Agriculture and Agricultural Cooperatives
Baht	Thai currency (US\$1 = Baht 25.9905 in March 1990)
BOB	Bureau of the Budget
CDD	Community Development Department
Chaek Group	Farmers who receive irrigation water from the same farm ditch are organized into a water users group or "Chaek Group"
CTF	Consultant Task Force
DLD	Department of Land Development
DOA	Department of Agriculture
DOAE	Department of Agricultural Extension
DTEC	Department of Technical and Economic Cooperation
EEC	European Economic Community
EOPS	End of Project Status
ERR	Economic Rate of Return
Huai	Ephemeral Stream
Kaset Changwat	Provincial Agricultural Extension Officer
ISPAN	Irrigation Support Project for Asia and the Near East
MOAC	Ministry of Agriculture and Cooperatives
NESSI	Northeast Small-Scale Irrigation Project
NEWMASIP	Northeast Water Management and Systems Improvement Project
PACD	Project Assistance Completion Date
O&M	Operations and Maintenance
Rai	Thailand measure = 0.16 hectare (or 6.25 rai = 1 hectare)
RID	Royal Irrigation Department
RTG	Royal Thai Government
TEAM	TEAM Consulting Engineers Co. Ltd.
USAID	United States Agency for International Development
WMS II	Water Management Synthesis II Project
WUA	Water Users Association
WUG	Water Users Group (Chaek group)

PROJECT ASSISTANCE COMPLETION REPORT

Northeast Small Scale Irrigation Project (NESSI)

Project Number 493-0312

1. Project Goal and Purpose

Project Goal: The long range goal to which this project contributes was to improve the quality of life of the rural poor. This project approach, targeted in Northeast Thailand where the bulk of the rural poor are located, was to have a substantial beneficial effect assuming that the approach was replicated. The Social Analysis pointed out that about 55 percent of the Project's target beneficiaries were below the "absolute poverty" line as defined by the World Bank, and this percentage conformed closely to the commonly accepted percentage (60%) for the rural Northeast as a whole.

Measures of Goal achievement included higher per capita earnings and decreasing disparity between the rich and the poor as shown by their equitable share in increased cropping area, land productivity, cash earnings from agriculture, and local level decision making groups. To achieve these objectives it is assumed that the RTG will continue to focus major efforts on rural development and equity improvement.

Project Purpose: The purpose of the Project was to establish a replicable approach and institutional capabilities for increasing agricultural incomes for small farmers within command areas of existing tank irrigation systems in Northeast Thailand. The developmental hypothesis implicit in this purpose was that through interventions (input-outputs) which address the major identifiable constraints to increasing agricultural production in irrigable areas of the Northeast, and by addressing marketing constraints, the Project would help farmers in the target areas to increase incomes (purpose) and train RTG technicians to replicate the approach elsewhere, thus contributing to better living standards throughout the Northeast (Goal).

End of Project Status (EOPS) would be indicated by improvements in cropping patterns and increases in area cropped, higher farm incomes, established training programs and plans to replicate the Project. Specifically, in the command areas of the seven tanks, the following conditions should exist by the PACD:

- Cropped area in wet season increased by minimum of 100% to 14,000 hectares with cropping intensity of at least 125%.
- Average net farm income increased by minimum of 40% to more than \$1,300 equivalent per household, with equitable distribution of benefits.
- Training program for participating agency personnel and farmers based on project approach were instituted.
- RTG plans to replicate approach in other sites.

## 2. Accomplishments: Actual and Projected

A. Project Institution: The project organization is divided into 2 parts as follows:

### (1) Project Policy and Budget Control:

(a) Central Level: The Project Coordination Sub-Committee, the top of the project level management hierarchy, was responsible for the control of the project policy, budget, and implementation, especially the coordination between Project Agencies and other concerned agencies in order to achieve the Project objective and satisfy the condition of the Loan Agreement.

The Sub-Committee had the Deputy Permanent Secretary of the Ministry of Agriculture and Cooperatives (MOAC) as Chairman, Project Coordinator (Director of the Projects Division) as member and secretary, Project Manager as member and assistant secretary, and representatives from concerned agencies, namely Royal Irrigation Department (RID), Department of Agricultural Extension (DOAE), Department of Land Development (DLD), Department of Agriculture (DOA), Fiscal Policy Office, Bureau of the Budget, Bank of Agriculture and Agricultural Cooperatives (BAAC) and Department of Technical and Economic Cooperation (DTEC) as members.

The Project Coordinating Sub-Committee played little direct role in project implementation. Direct involvement of the Project Coordinating Sub-Committee, which was created when the project needed a means to bring NESSI issues directly to the attention of national officials, even with relatively infrequent meetings, appeared to have been a useful and responsive entity.

(b) Local Level: The Province Operations Committees had the responsibility of directing the site operation, especially the cooperation among concerned agencies at the provincial level, in accordance with the policy framework set out by the Central Level so that sub-project operation could achieve the established objective. The Committee had the Governor as its Chairman, the RID Provincial Engineer as member and Secretary, RID Chief of O&M Section and DOAE Assistant Kaset Changwat (Subject Matter Specialist and co-site team leader) as members and assistant secretaries, provincial chiefs of DOAE, DLD, CDD, BAAC and District Officer, representative of the Northeast Regional Office of Agriculture and Project Manager as members.

Provincial Operations Committees organized in each of the seven provinces involved served a legitimizing role for the project rather than filling an active working function. The committees' primary utility was to provide an orientation at the beginning of the project and formally create a field working group for each site.

(c) Field Working Group: At the sites, field working groups emerged as very effective coordinating bodies for government agencies and farmers, and clearly contributed to project implementation. Meetings were held monthly, with fixed agendas that included achievements, plans, and problems. Officers from participating irrigation, extension, and other line agencies attended the meetings, as did officers of water users associations.

(d) Project Manager: Work execution by the Project Manager has been one of the important factors contributing to project success. The key characteristics and favorable performance of the Project Manager leading to success can be summarized as follows:

- Working as the Project Manager on a full-time basis.
- Having prior experience from working in other special projects.
- Giving importance to work coordination among concerned agencies and acting as coordinator to create understanding and cooperation in organizing project activities, both formally and informally.
- Giving interest to problems and seeking ways to solve them in order to facilitate work and to gain cooperation from agencies concerned.

B. Water Users Groups (WUG): Within a relatively brief four-year period, NESSI formed Chaek groups (farmers who receive irrigation water from the same farm ditch are organized in to a water users group (WUG) or "Chaek group") and revived Water Users Associations (WUAs) inactive since their formation fifteen years earlier, during site construction. Hundreds of Chaek groups at nearly all the sites are now playing a direct role in on-farm system O&M, involving themselves in decisions about water delivery in farm ditches and contributing labor and cash for maintenance. WUAs have been reactivated and appear to be overseeing site activities, while offering a degree of accountability to members. Royal Thai Government (RTG) staff now meet regularly with farmers and include them in decision-making concerning both water scheduling in the farm ditch and dry season cropping.

C. Operation and Maintenance (O&M): Irrigation system O&M responsibility was clearly divided between RID and farmers. This has helped reduce RID's problem of staff and budget shortage. The simple O&M procedure adopted for the project facilitated work of RID field staff as well as those of WUGs. The systematic water management procedure has resulted in relatively reliable water supply delivery and equitable water allocation. Water dispute which was common in the past has now practically been eliminated. After a few seasons, farmers expressed confidence in their water supply and land utilization has increased steadily to reach the available water potential. A unique feature of the project was that farmer participation in irrigation

system maintenance has been satisfactorily high. Indeed, although in principle farmers are expected to be responsible for the on-farm system only, they have actually extended their participation to the main system.

D. Agriculture and Extension: Agriculture and Extension accomplishments may be described in two parts:

- Related to productivity of farmers and
- Related to implementation of line agencies.

(1) Productivity of Farmers:

Accomplishments Related to Project Paper's Objective:

(a) Full Land Utilization in Wet Season: (100% of irrigable area): Statistics of wet season cropped area indicated that in the command area where rehabilitation had been completed, rice transplanting could be fully performed at all sites each year even in dry years. This was not so for nearby areas and for the majority of farm areas in the Northeast. Average yields also increased close to the target (yield at Project break-even point) established in the project paper.

(b) 25% Land Utilization in Dry Season: The total amount of rainfall is important in determining irrigable area in the dry season as it is the single limitation to dry season land utilization. However, the 25% dry season target is only an average value in the long run of every site. Therefore, total assessment of accomplishment in dry season land utilization cannot be done at this stage since construction works at some sub-projects have just been completed and, for every site, the agricultural development activities to take place after construction has been carried on only for a short period of time, less than 5 years. Only the 4 sites where construction was completed before 1989 could be assessed for dry season land utilization - Huai Aeng, Huai Kaeng, Phuttha Utthayan and Huai Khilek. It may be concluded that the progress on dry season land utilization indicates a trend towards achieving the Project objective. Two obstacles remain - the rehabilitated irrigation system must be maintained in good condition to be able to deliver water to farmers, and dry season crop promotion must be seriously and continuously carried out, especially within the first 5 years after the completion of construction.

(c) Average Farm Income of 26,000 Baht per Year: From the evaluation by the Field Working Groups in 1988/89, average farm income of farmers of Huai Aeng and Huai Kaeng almost reached the target with a trend showing that the target would be reached very soon. Phuttha Utthayan farmers had average farm incomes higher than 26,000 Baht target.

E. Accomplishments Related to Production Development

(1) Commercial Production: Crop production of farmers, including wet season rice, changed from production for home consumption to production for sale. Area planted to glutinous rice, which is needed for home consumption, has gradually decreased because the risk of production has been reduced. As rice transplanting could now be done with confidence, farmers turned more to production of non-glutinous rice because of better yields and prices. Increasingly, progressive farmers grew only non-glutinous rice and bought glutinous rice for consumption.

(2) Dry season cropping turns to quality and agro-industry: Dry season cropping in all sub-project areas, which started from familiar crops and/or crops with local market demand, is now turning to quality production for higher price to satisfy the demand of consumers who have higher purchasing power. For example, the yard-long bean growers group at Hual Aeng produce good quality yard-long bean through careful production planning and control to ensure regular market supply, and produce baby-corn, tomato, tomato seeds, and others for supply to local agro-processing factories, as well as seed production for the Seed Multiplication Center which has expanded over nearly all sites.

(3) Use of Modern Inputs: Farmers accept and increasingly use modern production inputs. Nearly all crop varieties were those recommended by the line agency. Every farmer used fertilizer and chemicals in their production activities. Farm machinery has also gained increasing popularity among NESSI area farmers.

F. Accomplishments related to Implementation by Project Agency: The DOAE, as an implementing agency, took part in developing the overall project implementation approach and has now accepted the "Field Working Group" and the "Extension Program" for adaptation to other medium and small scale irrigation implementation in Thailand. In this respect, the NESSI Project has significantly contributed to the DOAE's operation in both institutionally and in the development of extension technology for use in irrigated areas of the Northeast.

G. Training: Training has been regarded as a very important project element even though it was not explicitly included in the Project Paper. When the Technical Assistance started in 1982 it was quickly discovered that the field staff of both Royal Irrigation Department (RID) and Department of Agricultural Extension (DOAE) lacked the knowledge required to implement and support an irrigated agriculture project of this size. The situation for RID field staff was more severe as most of them has less education than their DOAE counterparts. The farmers also lacked of knowledge and experience in irrigation practice. Lack of reliable irrigation water in the past was identified to be the main cause. In addition, it was found that the staff concerned lacked both experience in working as a team and knowledge in project management. The new irrigation system which incorporated rotational water delivery method added more confusion to staff and farmers in the early project period.

The above problems led the NESSI Project to give special emphasis on training and, as a result, many training programs were organized throughout the project implementation period.

NESSI/Water Management Synthesis II (WMS II):

In addition, the NESSI/WMS II Project centrally funded program in O&M training contributed to improvements in management by establishing the following training courses:

- Operation training
- Maintenance training; and
- On-farm water management training.

For the above training courses, RID and DOAE staff were responsible for the preparation of training materials, training organization, management, and implementation. Selected staff from RID and DOAE had been trained in the U.S. as trainers and they had contributed significantly to the training programs establishment.

The NESSI field manual for WUGs, which is a cartoon-based booklet, has won wide recognition both in the NESSI project area and in other projects. Part of the manual has been reproduced for use in various irrigation projects in the Northeast. Many of these projects have planned to produce similar manuals for their own use.

H. Economic Analyses: From the project study stage until the project termination, six economic analyses were conducted as described below:

(1) The feasibility study by Asian Institution of Technology (AIT): The feasibility study of the project was conducted by AIT in 1977. Economic analysis was done to check for investment justification. The analysis showed that out of the ten tank sites studies the 7 NESSI sites would give economic rate of returns (ERR) greater than 10 percent.

(2) The project paper by USAID: During the project preparation in 1980, USAID revised the AIT economic study by updating data and found that the ERR of each sub-project would still be greater than 10 percent.

(3) Study by the Consultant Task Force (CTF): During the implementation stage it was found that the cost would increase significantly, therefore, the CTF was assigned to revise the economic study again. The three sites, Huai Aeng, Huai Kaeng, and Phuttha Utthayan, were selected for the study since their designs were available and the cost estimate could be done more accurately. The study confirmed that ERRs would be greater than 10 percent.

(4) Study by a special expert: USAID was still not confident of the economic viability of the project and a special expert (Mr. Jerry Knapp) was contracted to repeat the economic analysis. Huai Aeng was chosen as a case study and the result still confirmed previous findings.

(5) Evaluation by the Bureau of the Budget (BOB): In 1987 the Evaluation Division of the BOB conducted an evaluation of the project. The economic analysis was again revised using updated data and the results confirmed EERs of more than 10 percent.

(6) Applied study by Irrigation Support Project for Asia and the Near East (ISPAN): Finally in 1989, ISPAN was contracted by USAID to conduct an applied study of the NESSI Project. The economic analysis was again revised, this time using Huai Aeng, Phuttha Utthayan, Huai Khilek and Huai Chorakhe Mak as the case studies. The study again confirmed the economic viability of the project.

(7) RTG Plans to replicate approach in other sites: EEC recently agreed to offer a grant of approximately Baht 900 million to RID to implement the replication of NESSI approach for on-farm development activities of nine medium scale irrigation tanks and three dams in the Northeast. This grant will fund the six-year Northeast Water Management and System Improvement Project (NEWMASIP). The purpose is to improve/rehabilitate the existing dams and irrigation tanks and on-farm systems.

Therefore, it may be well concluded that project investment is economically justified.

### 3. Summarized Project History

The 1978 Report on "Water for the Northeast" prepared by the Asia Institute of Technology (AIT) for the Royal Thai Government's Water Resources Sub-committee point out that the farmers of the Northeast are plagued by unreliable seasonal rainfall and that the Northeast has the lowest crop yields per area of any region in Thailand. Most rainfall is lost to the farmers as it quickly percolates through the sandy soils. In the dry season water is scarce. Despite these problems, the report concludes that much of the demand for basic household water requirements could be met through existing water resources and that the first priority for water resource development in the Northeast should be the better distribution of available resources through improvement to existing systems.

There is considerable potential for increasing crop yields in the Northeast that is not being realized due, at least in part, to poor utilization of available water resources. Estimates vary depending on source, but it appears that less than 20% of the Northeast's irrigation area from existing water resources of about 650,000 hectares is actually being irrigated in the wet season, and less than 5% in the dry season.

One of the important resources for irrigation in the Northeast is the more than 200 small to medium-sized tanks in the region. RID estimates that these tanks, ranging in size from about 1 million cubic meters to over 20 million cubic meters, command and irrigable area of over 175,000 hectares. However, since most of these tanks have incomplete or deteriorated irrigation systems that are being inefficiently utilized, only a fraction of their potential is being realized.

There are numerous problems in improving the crop production and incomes of farmers within the command areas of these tanks. Many existing tanks and their delivery systems require some design modifications and/or considerable rehabilitation as well as extension of their canal systems in order to maximize their water delivery and utilization potential. Construction and/or improvement of the on-farm structures (ditches and dikes) is especially needed in many cases, and construction of related infrastructure such as operation and maintenance roads and farm-to-market roads can also be important.

Besides the capital improvement needed to existing tank systems, there are many other constraints that must be overcome before the water available from improved tank systems can be properly utilized to improve agricultural yields. Maintenance of existing systems has been poor and irrigation water, even when available, is generally not well managed within the system. Cropping patterns and cultural practices do not maximize returns and cropping intensities are well below the potential. Farmer access to agricultural inputs such as quality extension services, low-cost credit, unadulterated fertilizer, pesticides, seeds, etc., has been generally inadequate. Marketing problems are also important constraints and farmers need assurance of dependable market access and attractive prices before they will invest their money and labor to improve yields.

The NESSI Project sought to establish a sustainable system for increasing the agricultural productivity and income of more than 30,000 rural poor within the potential command areas of seven existing small to medium size tanks in the Northeast of Thailand. The strategy of the project was to address the major constraints to improve productivity in the Northeast Region through a package of consultant assistance, demonstrations, training and construction that would provide:

- basic infrastructure for reliable delivery of water to farmers' fields;
- improved arrangement for key RTG agricultural service organizations to deliver their services to farmers;
- adequate procedures to help link up farmers to necessary agricultural inputs and markets;
- strengthened farmer organization structure for managing and maintaining on-farm water delivery; and
- a training system that would motivate farmers to properly utilize inputs to increase yields and market their crops.

The NESSI Project was expected to yield an implementation approach which would provide model for rehabilitation of about 200 of the remaining small-medium tanks in the Northeast which have sufficient storage capacity to warrant development. It should be pointed out that the seven tanks selected for the NESSI Project were seven of the ten largest tanks in the Northeast in terms of storage capacity. In fact, the NESSI Project tanks have storage capacities in the range of 15-35 million cubic meters, whereas of the remaining tanks, about 45 have capacities of 3-5 million cubic meters and about 100 have capacities of only 1-3 million cubic meters.

#### 4. Beneficiaries - Direct and Indirect:

At the end of the project, approximately 4,600 households within the irrigation areas of seven tanks have directly benefited from the irrigation system which is capable of providing water to approximately 78,884 rai (31,554 acre) of their farm land in the wet season and 25% land utilization in dry season (approximately 19,720 rai or 7,888 acre). Cropping intensity during the wet season is 100%, with farmers planting mostly high yielding strains of glutinous rice. Wet season rice yields are two to three times higher than yields before irrigation was available.

Indirect Benefits: Indirect benefits which have not been considered in the project economic evaluation include the followings:

(1) Income from employment in construction work: Farmers in the project area and the nearby area were employed as technicians or laborers during the construction period and could therefore derive additional income from such employment.

(2) Rice transplant in the nearby area: Most of the farmers in the project have their lands located both inside and outside the command area but all nurseries would always be prepared inside the command area as irrigation water was available. The nursery was also used for their lands outside the command area and, as a result, rice transplant could be done in these lands even in the dry year or when there was shortage in rainfall.

(3) Dry season land utilization by outside farmers: Farmers in the project normally grew 2-4 rai of dry season crops although the average farm holdings were 10-15 rai. This was due to labor shortage and because dry season crops need rather intensive care. Also, in the first few years farmers still lacked experience in growing dry season crops therefore they allowed their relatives or friends in nearby area to utilize their lands for dry season cropping.

(4) Reduction of seasonal migration: Although firm statistics were not available, information from field work showed that seasonal migration had decreased from the past, especially at Hual Aeng. Family members tended to stay in the area to provide labor for dry season. There were also a few cases of farmers migration back to the project area.

(5) Increased fish farming and animal husbandry: Improvement of the irrigation system not only facilitated normal cropping in both seasons but also helped provide water for increased fish farming and animal husbandry. Fish ponds and mixed farming were becoming more common and had provided farmers with additional income and better nutrition.

(6) Decrease in soil salinity and increase in soil fertility: Year-round land utilization was believed to help decrease the soil salinity problem, which was generally found in all sub-projects. Waste from dry season crop, especially legumes, would help increase the soil fertility when they were ploughed into the soil. Many farmers reported that, for the plots they used for dry season crop, rice yields had noticeably increased.

(7) Increased capability of farmers: Project implementation related to farmers and water users groups has put emphasis on participation and self-help concepts. The training program, group organization and development, and various promotion activities have significantly increased the capability of farmers in production, execution of group activities, business operation for input and marketing, and coordination with staff of line agencies. The experience and knowledge developed under the project will be useful for other activities and will help to improve further their quality of life.

#### 5. Summary of Lessons Learned:

NESSI was conceived and initiated during a turbulent period in Thailand's history. Since NESSI's conception in the late 1970s, Thailand has undergone dramatic economic and democratic changes and, at present, is one of the strongest economies in Asia. Lessons learned from activities carried out during this period, including those learned from NESSI, are valuable not only for Thailand, as it rehabilitates additional medium-scale irrigation systems, but also for other countries in the region that struggle to address poverty in lower-income areas.

NESSI faced a number of challenges in the early years: Budgetary, staffing, institutional, and organizational. Due to delays caused by under funding, the expatriate consulting firm had basically completed its contract before NESSI was at a point to use many of the skills available. As a result, the local contractor, TEAM Consulting Engineers Co., Ltd. carried the weight of the responsibility and deserves credit for much of the project's success. Thailand is fortunate to have capable local engineering contractors and will certainly want to draw on them in the future.

Sites developed under NESSI are at a stage where economic opportunities for farmers are very high. In order to maximize economic benefits from improved irrigation water availability, stronger Chaek groups and WUAs must exist, and RID must continue to work closely with these groups to encourage and support them. In addition, it is critical that farmers work closely with private-sector firms to establish an equitable contracting system benefiting both parties. Prior to expansion of the private sector in the Northeast, market opportunities were very limited. Now that these opportunities exist,

all efforts must be made to link producers and farmers in the productive chain. Strengthening Chaek groups and developing an expanded role for WUAs will take a significant effort from RID. This is a new role, which requires that RID enhance the capabilities of its On-Farm Water Management Branch. However, if RID is ever to benefit from increased farmer contributions for O&M, the agency must make a commitment to increasing its own capacity to train and work with the water users groups.

Under the present "Greening of the Northeast" program, there is a tremendous amount of development activity, much of it focused on water resources. This activity follows two decades of various water resource development projects organized through RID, Land Development Department, Community Development Department, Accelerated Rural Development Department, Public Welfare Department, Khon Kaen University, the Army, National Energy Administration and a multitude of other agencies. While a large number of projects have been completed that provide benefits to the population, the projects have been carried out in a relatively uncoordinated way. As a result, competition for water resources in the Northeast is increasing. Before the Northeast is faced with another major drought year to lead to a crisis, it is necessary to study present conditions in the different sub-basins and determine the exact water balance in each system. Otherwise, as is becoming apparent, new projects will simply take water from older irrigation systems, causing their benefits to decline. Soon, competition with industry and tourism for the limited water supplies will be the most serious problem farmers face.

Thailand's development experience provides a model for other countries in the region. Certainly, Laos, Cambodia, and Vietnam all look to Thailand as an economic model they would like to emulate. Indonesia, Malaysia, and Philippines are also interested in the Thailand model, particularly its balanced growth between agricultural and industrial exports. Thai businessmen are already involved in agricultural and tourist-related activities throughout Southeast Asia. With its strong economic base, Thailand will continue as a regional development resource for the next two decades.

The secret of Thailand's success has been the RTG's willingness to let the private sector do what it does best. This policy has meant that the RTG does not hesitate to withdraw from public service areas when the private sector demonstrates that it can perform the service better, and at less cost to the government. Thailand has allowed the private sector to provide such services as air travel, toll roads, lower and higher education, agricultural input, agricultural marketing, and exports. It has also encouraged the private sector to provide more traditional public services: seed development, agricultural research and extension, express mail service, power generation, and even water resource development. The private provision of public services brings the forces of competition into areas of monopoly. In Thailand, it has been demonstrated repeatedly that these forces lead to better services at a lower price.

With respect to NESSI, it is clear that the emergence of private-sector processing plants has ensured that farmers can benefit from their labor. When NESSI reservoirs were first constructed in the 1960s, farmers had water but no outlet for their products. Given their limited economic incentives, farmers did not use the water. Today, by contrast, at every Northeast location where dry season water is available, farmers are eager to produce crops and private processing plants want to buy them. When local farmers are not interested, farmers from other parts of the Northeast will rent their land. Due to RTG encouragement of private-sector investment, massive past investments in water resources development are paying vary returns for farmers in Northeast Thailand and for the country as a whole.

6. Review of Warranties and Project Covenants:

Article 4 (Grant) and 5 (Loan) - Conditions Precedent (CP):

<u>(1) Initial CP to Disbursement (Grant and Loan)</u>	<u>Remarks</u>
a. establishment of the Project Coordination Committee, Provincial Operations Committee and first site team	Met
b. Co-Project Manager Appointed	Met
<u>(2) CP to Disbursement for Each Project Component other than Advisory Services:</u>	
a. Plan of Action and Financial Plan	Met
b. Legal Opinion	Met
c. Appointment of Borrower's Authorized Representatives	Met
<u>(3) CP to Procurement of Equipment (except jeeps):</u>	Met
<u>(4) CP to Construction of Each Service Center:</u>	Met
<u>(5) CP to Construction to On-Farm Development at Each Site:</u>	Met
<u>(6) Special Covenants:</u>	
a. Project Evaluation: To establish an evaluation program as part of the project	Met
b. O&M: To assure an effective program of and adequate annual budgetary provisions for O&M for all infrastructure	Met

7. Post-disbursement Reporting and Residual Monitoring Requirements:

The terminal disbursement termination date was extended July 15, 1990 by PIL No. 69, dated April 12, 1988 in order to allow adequate time for the RID to finish all disbursement. No post-disbursement reports are required or recommended. The Royal Irrigation Department showed ability to monitor the implementation of the project with little or no supervision from the USAID Project Officer. Direct residual monitoring by USAID will not be necessary or possible.

8. Summary Financial Statement:

A. Life of Project: 9 years

- Date of Agreement: September 24, 1980 (Loan)  
August 29, 1980 (Grant)

- Terminal Date: October 15, 1989 (Loan and Grant)

B. Life-of-Project Funding:

USAID (L) US \$5,800,000 (G) US\$2,900,000  
RTG US\$11,520,000

Total US\$17,320,000

C. USAID Contribution:

<u>Project Title/ Element Description</u>	<u>Total Obligations (US\$)</u>	<u>Total Expenditures (US\$)</u>	<u>Deobligation (US\$)</u>
<u>LOAN:</u>			
1. Construction/Rehabilitation	5,372,618	5,294,482	78,136
2. RTG Staff Support	427,110	421,430	5,680
3. Contingency/Inflation	<u>272</u>	<u>          </u>	<u>272</u>
TOTAL	<u>\$5,800,000</u>	<u>\$5,715,912</u>	<u>\$84,088</u>
<u>GRANT:</u>			
1. Technical Support	2,366,316	2,364,199	2,117
2. Grant Support	482,963	476,067	6,896
3. Evaluation	50,044	50,044	-
4. Contingency/Inflation	<u>677</u>	<u>          </u>	<u>677</u>
TOTAL	<u>\$2,900,000</u>	<u>\$2,890,310</u>	<u>\$6,690</u>

D. Host Country Contribution: (Baht)

1. Construction	270,290,809
2. Staff Support	13,296,294
3. Technical Support	3,389,011
4. Grant Support	<u>924,660</u>
TOTAL	<u>Baht 287,900,774</u>
	<u>US\$11,520,000</u>

(Note: Rate of Exchange: Baht25.00 = US\$1)

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ACTION MEMORANDUM FOR THE MISSION DIRECTOR

April 20, 1990

THROUGH: DD, Steven P. Mintz   
FROM: PDS/PSD: Kamol Chantanamate, Project Officer  
SUBJECT: Northeast Small-Scale Irrigation Project Completion Report  
(AID Project Number 493-0312)

Background:

The Northeast Small Scale Irrigation Project Assistance Completion Date (AID Project Number 493-0312) was completed on October 15, 1989. AID Handbook 3 requires the preparation of a "Project Assistance Completion Report".

Discussion:

The attached Project Assistance Completion Report follows the guidance for preparing such reports as contained in Handbook 3, Chapter 14, Appendix 14A. It includes a brief review of project accomplishments, a statement of lessons learned in implementing the project, and the summary of project history. The report was written by the Project Officer who, in addition to personal observation of the project, relied upon written reports from the Thai engineering firm (TEAM Consulting Engineers Co., Ltd.) and from the study conducted under the Irrigation Support Project for Asia and the Near East (ISPAN).

The conclusion of the project completion report is that the NESSI project made significant headway in developing a low-cost, replicable approach to rehabilitation and Operations and Maintenance (O&M) of medium scale tanks in Northeast Thailand. Farm income in the NESSI area increased dramatically as a result of stable wet season supplemental irrigation and diversified cropping in the dry season. The growth of agricultural processing in the Northeast provided additional outlets for local products (peanuts, tomatoes, baby corn) and competitive local markets for dry season production. These agro-industrial firms, in some cases, provided credit and technical assistance via contracts and private extension agents.

Organizational changes were made in project implementation during the life of the project. An important organization at the field level was the field working groups, located at the irrigation sites, which played a major

coordinating role among implementing agencies (Department of Agriculture, Department of Agricultural Extension, Royal Irrigation Department, and Community Development Department), farmers and the private sector.

The emphasis upon strengthening Water User Groups (WUGs) paid dividends through increased farmer participation in planning of on-farm systems, in decision-making for dry season cropping patterns, and in O&M which in some cases extended as far as the main canals. In most cases, the water user groups established small water user fees for wet and dry season services. These fees were used for short-term credit for agro-inputs and for purchase of O&M related supplies and equipment.

For the last two years of the NESSI project, design teams from donor agencies visited USAID on several occasions to discuss the progress of the NESSI project and to get information on implementation and organization of NESSI. In December, 1989, the Royal Irrigation Department received 900 million Baht (\$36 million) from the European Economic Community (EEC) to develop 9 irrigation sites in the Northeast. The "approach" to be followed in planning and implementing the renovation of these tanks and the development of on-farm systems is the model originally developed and now refined as a result of USAID and RTG's "NESSI" project. The ultimate test of success is replication. The NESSI met all expectations.

The reader is referred to the ISPAN study entitled "Medium Scale Irrigation Systems in Northeast Thailand: Future Directions" and the report of TEAM Consulting Engineers Co., Ltd. "The Northeast Small Scale Irrigation Project Completion Report" for additional information on the NESSI project.

Recommendation:

That you signify your acceptance of this completion report by signing below.

Accepted: John R. Erickson

Rejected: \_\_\_\_\_

Date: April 23, 1990

Clearances:

TR/ARD:DAElgado (draft) 4/2/90  
O/TR:DJClark (draft) 4/4/90  
PDS/PSD:Det Trisahd (draft) 4/5/90  
PDS/PSD:THammann (draft) 4/9/90  
O/PRO:PTHormann (draft) 4/19/90  
CONT:DSFranklin (draft) 4/19/90

<sup>1/6</sup>  
PDS/PSD:Kamol:kc:3/30/90 (4132R)