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**SUMMARY OF MAJOR FINDINGS AND RECOMMENDATIONS  
THAILAND LAND SETTLEMENTS PROJECT EVALUATION**

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**Prepared by**

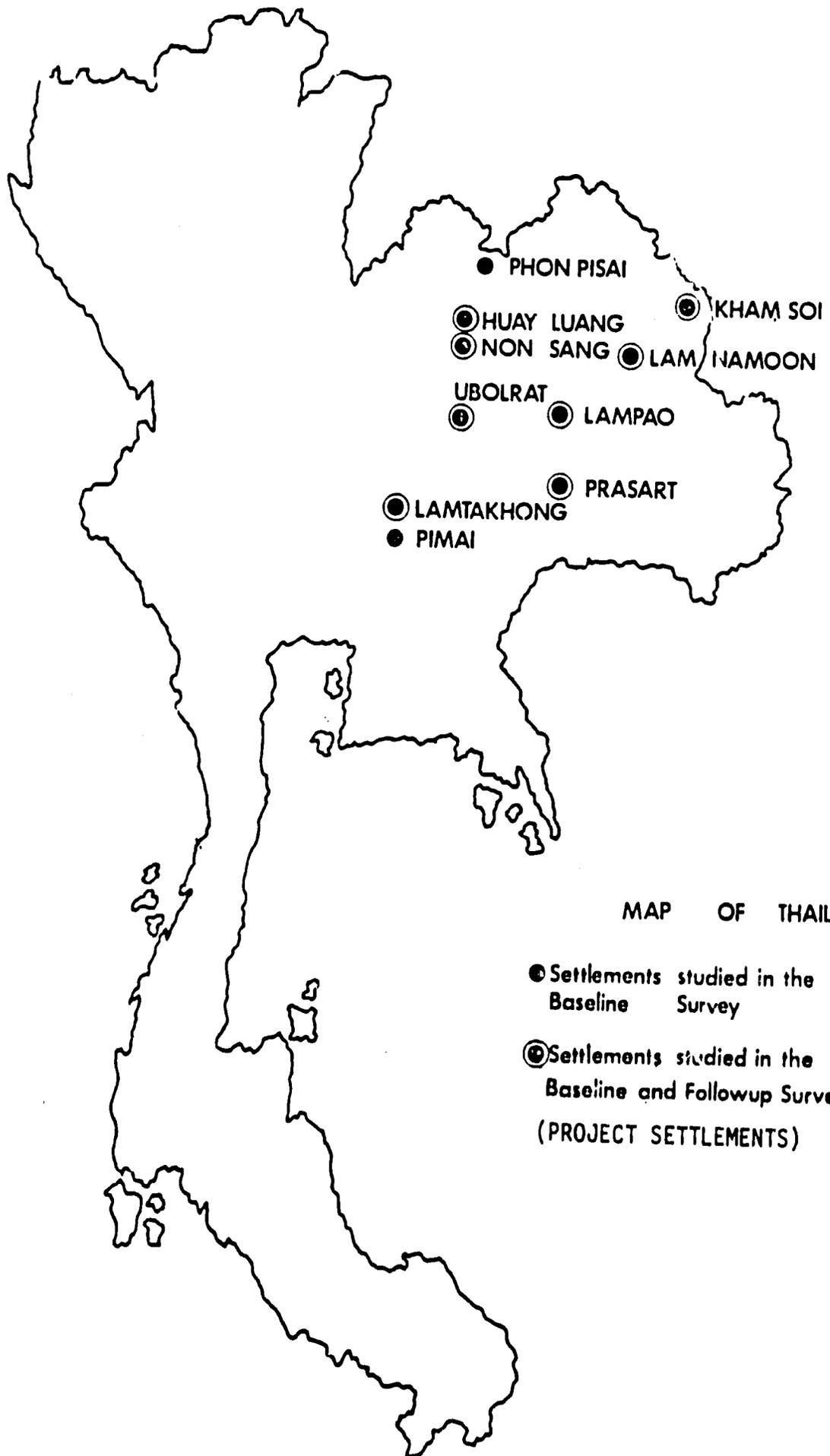
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MAP OF THAILAND

- Settlements studied in the Baseline Survey
- ⊙ Settlements studied in the Baseline and Followup Survey (PROJECT SETTLEMENTS)

## BASIC PROGRAM IDENTIFICATION DATA

1. Country: Thailand
2. Bilateral Project Titles: Land Settlements Project
3. Bilateral Project Number: 493-0289
4. Program Implementation:
  - A. First Project Agreement: September 20, 1979
  - B. Final Obligation: October 18, 1984
  - C. Final Input Delivery: December 31, 1984
5. Program Funding: (\$000)
  - A. A.I.D. Bilateral Funding: \$4,200
  - B. Other Major Donors: \$340
  - C. Host Country counterpart Funds: \$4,090
6. Mode of Implementation:
  - A. Project Loan Agreement Between USAID/Thailand and Ministry of Finance
  - B. Project Grant Agreement Between USAID/Thailand and Department of Technical and Economic Cooperation.
7. Previous Evaluations and Reviews: September, 1982
8. Responsible Mission Officials:
  - A. Mission Director: Mr. Robert Halligan
  - B. Responsible Project Officer: Ms. Thongkorn Hiranraks
9. Host Country Exchange Rates:
  - A. Name of Currency: Baht
  - B. Exchange Rate at Time of Project: \$1 = Baht 23.00

## EXECUTIVE SUMMARY

### A. Problem and Overview

The Land Settlements Project seeks to address priority development constraints within eight of Thailand's poorest "self-help" land settlements located in the Northeast region of the country. Among these constraints are: poor resource endowment, particularly as concerns water supply; suboptimal use of land, labor, and available agricultural technologies; a limited amount of land available for further expansion of agriculture; and limited local development planning. The primary focus of the project is to help settlement farmers make the best possible use of available resources as a means of increasing agricultural production and improving their standard of living.

This project compliments numerous other projects supported by USAID and other external donor agencies which attempt to circumvent constraints to productivity and output growth in Thailand's agriculture sector. This project is also consistent with a shifting emphasis toward efforts to improve agricultural production in the Northeast region of Thailand, the poorest region of the country.

### B. U.S. Assistance

This project (project number 493-0289) was introduced as an element in the RTG/USAID program goal of improving the quality of life and increasing the incomes of the rural poor, with special emphasis on the Northeast. The primary purpose of the project was to enable small farmers in the eight target land settlements make maximum effective use of their land through techniques that could be readily replicated throughout the Northeast. Project objectives included: improvement of farm planning through appropriate crop diversification, improvement and maintenance of soil fertility, adoption of year round cultivation of land, improvement of access to needed goods and services among the rural poor, and development of a replicable development and evaluation program. The project emphasized "bottom up" approach in project implementation to promote increased local participation in the planning and management of scarce local resources and development activities. The projects' emphasis on "beneficiary participation" represented a new approach to development by the Department of Public Welfare (DPW), the project implementing agency.

U.S. funding for the project supported technical assistance was in the form of two project technical advisors, in-country research, training of project staff and target farmers, and modest infrastructural improvement (i.e. road construction and water resource development sub-projects). Total funding for the project was \$4.2 million. Starting and ending dates for the project were September 20, 1979 and December 31, 1984, respectively.

### C. Purpose of Evaluation

This is an end of project evaluation and, as such, its primary purpose is to document the end of project experience and lessons learned. Due to a shortened project implementation period, no mid-term evaluation was

undertaken. Pre-implementation (i.e., baseline) measurements of key project effect and impact indicators were, however, collected via household surveys shortly prior to implementation and in combination with comparable followup survey data provide the primary basis for assessing project effects and impacts. All conclusions regarding project period changes in farming practices/patterns and standard of living in the project land settlements are based upon the results of these two rounds of surveys.

Findings regarding other key questions in the evaluation team's scope of work are based upon review of project documents, field visits to the project land settlements, and interviews with management/project staff of USAID and the RTG agencies involved in project design/implementation.

No special problems were encountered in connection with the evaluation strategy adopted.

#### D. Findings

Overall, the degree of beneficiary participation was satisfactory in accordance with the project design. There were indications that the beneficiary participation resulted in better utilization of scarce local resources, particularly in agriculture, and the beginning of an organizational base for continued "bottom up" activities was created.

There is evidence of a marginal improvement in standard of living among beneficiaries, and, in a relatively short period of time, the project has contributed to the sustainability of agriculture in the land settlements. Although growth in farm production is expected to fall short of that anticipated in the project's economic analysis, it is anticipated that the long-term return on the investment in this project will be quite acceptable. Most research and field demonstration activities made satisfactory progress.

The project was capably and wholeheartedly supported by both Royal Thai Government and USAID staff at all levels. There were no management problems which had serious deleterious effects on project implementation.

#### E. Project Design and Policy Implications

Since this project was active for only a short period (just under 3 years) due to a delay in implementation, it would be premature to point to sweeping project design and policy implications. The major implication from this project experience may in fact be that AID needs to be more flexible as concerns the length of project periods. In this project, the delay in implementation resulted in the projects' being terminated just as it was beginning to build up some momentum. Aside from this, however, an argument might be made for more flexible timing in projects such as this whose success depends upon changing traditional attitudes and practices. This is an inherently slow process and it would seem to be a less than cost effective mode of operation to have fixed time limits which are applied uniformly to all projects. Perhaps a variable project length and support level contingent upon host country implementing agency performance and progress evaluations might be considered as a way of circumventing this problem.

## PART I. MAJOR CONCLUSIONS AND RECOMMENDATIONS

### A. Beneficiary Participation

#### Conclusions:

(1) Overall beneficiary participation in selection and implementation of sub-projects was largely maximized and there were some early signs that some aspects of the project brought about improvements in management of scarce local resources; however, due in part to the delayed start of the project, the full impact is not yet visible.

(2) In accordance with the project design, beneficiary participation in infrastructure sub-projects was limited to selection of specific projects and project implementation sites. Roads, wiers, ponds, deep wells, most shallow wells, and rain storage tanks were constructed by contractors. In some cases, contractors hired local villagers to work as construction laborers, in effect paying the villagers to participate in a project of which they were the beneficiaries.

Most of the infrastructure sub-projects, both roads and water, appeared to have improved management and utilization of resources; however, as beneficiary participation was largely limited to construction of only a small proportion of the wells, most of the resource management gains cannot be ascribed to the beneficiary participation.

(3) For agricultural sub-projects beneficiary participation in both selection and implementation was quite good. Pilot Farmers who received training seemed to freely pass along their new knowledge to the 90% of farmers who did not receive training. Only two weak points were observed: first, the training courses themselves could have benefitted from the inclusion of increased practical "hand on" components. Second, field trips to let trainees view successful operation of the course subject matter were too often conducted at government operated projects rather than actual farmers' fields.

There were signs of gains in resource management/utilization resulting directly from beneficiary participation in agriculture sub-projects, e.g., increases in cropping intensity and crop diversification. In addition, poor soil quality was a major problem in most villages and beneficiary participation in soil conservation projects was just beginning to show the first signs of improvement in soil resource management. The foundations for a "bottom up" development base in agriculture have been laid; however, those gains could be largely lost if the agricultural extension agents do not remain in the project area for another two or three years.

Recommendations:

- (1) Beneficiaries should be required to invest some element of their own capital and/or labor in infrastructure projects to act as an acid test of the beneficiaries' desire for the project, and to increase the beneficiaries' feeling that the project is "theirs" and not just a gift from the government. Otherwise, projects may be implemented which appear in theory to result in resource management improvement but which in fact will not be used and/or maintained by the beneficiaries.
- (2) The agricultural extension agents assigned to the project should remain in place for at least two to three years to insure that the gains in the area of agricultural development will not be lost.
- (3) Training courses should include significant practical "hands on" components where farmers actually practice the new methods they have learned.
- (4) Field trips for farmer trainees to observe agricultural operations should be to the farms of successful farmers, not to government run and managed stations. The trainees would likely be much more motivated by seeing successful private farmers than by seeing government facilities.

B. Inputs Equal Self-Sufficiency

Conclusions:

(1) Overall, there is evidence of a marginal improvement in standard of living among project beneficiaries during the project period. In a relatively short period of time the project has contributed to the sustainability of agriculture in the land settlements. Largely as a result of the project, farming methods which raise production levels, reduce the need to bring additional land under cultivation, and reduce reliance on one or two crops have begun to be adopted by settlement farmers. Nevertheless, the team is uncertain as to whether the agricultural system prevailing at the end of the project is sustainable over the long term unless agricultural extension agents remain in the project areas for an additional two to three years. Changes in farming practices adopted to date by settlement farmers have been adopted on a small-scale, low-intensity basis and consist largely of practices which can be readily accommodated within the prevailing agricultural regime.

(2) With regard to the relative contribution of project components, to date the infrastructure development project components (i.e. water and roads) due to delayed implementation and other factors, have contributed relatively little, although a modest benefit from road construction may have been realized in marketing the harvest of the last crop during the project period. There is little evidence that improved land security affected farming practices during the project period, again due in part to the shortened project period.

(3) The team projects, based upon the factors considered in the project economic analysis, that the IRR the B/C ratios anticipated at the outset of the project will likely not be realized during the 15 year planning period adopted, even after allowance is made for the delay in project implementation. This is based largely upon the observation that settlement farmers do not appear to be committing 100 percent of their cultivatable land to the new

technologies as had been anticipated, but rather are doing so on a selective basis (i.e., for specific crops or portions of their land). As a result, the growth in farm production is expected by the team to fall short of that anticipated in the projects' economic analysis. This, in turn will reduce the magnitude of benefits deriving from the project-funded roads. The team also projects somewhat reduced benefits from project investments in water resource development due to questionable design/site selection in a number of instances.

(4) If only the factors included in the project economic analysis are considered, (which excluded many variables which are not easily quantified), the team anticipates that the IRR in the 15 year planning horizon used in the project economic analysis would likely not exceed 5 percent, while the B/C ratio during this period would likely not exceed 1.00. That, however, is, in the judgment of the team, probably an underestimate of actual returns to the project for several reasons. First, project benefits will likely continue to accrue after this 15 year period. In addition, it is anticipated that the technological changes and roads introduced by this project will form a "foundation" for future technological changes and economic expansion in the project land settlements. Further, the team anticipates some "non-quantifiable" benefits not considered in the economic analysis of both a short- and long-term nature will accrue to project beneficiaries and the economy. Among these are improved communications and social integration in the land settlement communities, more favorable marketing conditions, and improved health and nutrition as a result of improved access to more adequate water and food supplies. When these factors are taken into account, the team anticipates that the long-term return on the investment in this project will be quite acceptable.

C. Research-Application Linkages

Conclusions:

(1) Research and field demonstration activities made satisfactory progress in most areas. Although it is too soon to obtain detailed adoption rate statistics, preliminary indications are that farmers are accepting new crop production practices. Probably the biggest success has been improved rice varieties, with an estimated 90% of farmers growing improved cultivars; e.g., RD 6 rice. Another area showing positive signs of success is soil and water conservation demonstration. Although full benefits will not become obvious for a few more years.

(2) Several aspects of research activities left some room for improvement. For example, coordination among researchers, DPW representatives and program advisors during research planning was satisfactory yet there was considerable lack of coordination between researchers and extension workers during project implementation. In addition, although extension agents assisted in research data collection, their general lack of experience and training and the frequent turnover of temporary hire extension agents reduced their effectiveness in this role.

The research topics themselves with a few exceptions were generally suitable; however, research and extension activities in all land settlements were basically identical. They did not reflect the divergent problems and desires in each of the settlements. Also some field trial schedules were agriculturally inappropriate. The delivery of inputs to research projects and the distribution of research results also affected the success of the research component. The delayed delivery of some materials and supplies to the project sites at the beginning of the project reduced the effectiveness and precision of demonstration trials. This problem was resolved later in the project.

In addition, although, there was an attempt by DPW to utilize agricultural research and research personnel in developing demonstration activities for farmers' benefit, research results were not disseminated to extension agents, seriously reducing the benefits of the research.

D. Project Management

Conclusions

(1) The project was capably and wholeheartedly supported at all RTG management levels from the Director General of the Public Welfare Department on down to the project officers and agricultural extension leaders as it was at all levels of USAID. The fact that DPW Project managers spent much time in the field which was probably a major factor in the degree of success achieved by the project as was the ratio of one agricultural extension agent to three hundred farm families (in spite of the fact that most extension agents had had little or no previous experience). In addition, Volunteers (PCVs and VSOs) were a positive component of the project, although they provided assistance to extension programs more in the area of social development than in technical agricultural matters. Finally, the technical advisor was competent in the technical aspects of his field. Transfer of experience was probably less than optimal because of a lack of mutual understanding and agreement on the role of the technical advisor: he appear to be viewed by DPW managers a strictly a source of advice on technical matters, whereas he viewed himself as a management resource as well.

(2) Management problems were relatively minor in most instance, and did not result in significant reductions in accomplishment of project goals. The temporary employee status of many of the agricultural extension agents resulted in a high employee turnover rate which slowed project implementation. The turnover rate may have been aggravated by the fact that temporary employees' pay was often several months late when they were first posted and at the start of each fiscal year. In addition, some extension agents lacked

local language/dialect capability, probably reducing to some extent their overall effectiveness in dealing with the target populations. A greater degree of delegation of authority by settlement superintendants would likely have expedited some aspects of the project, as would a small superintendant discretionary fund to be used for minor unforeseen expenses and to finance small, unplanned projects. Problems with acquisition of inputs/supplies for the project in the first year were later at least partially alleviated.

Overall, commitment to bottom up management was occasionally inconsistent and, although a number of groups had been formed, added emphasis on farmers' groups would likely have increased the degree of success of agricultural extension sub-projects.

(3) The actual project plan had a few aspects that might have been accomplished differently: the basic project plan was developed with only very general information on the felt needs and actual needs of farmers; emphasis on quantitative success of the project, e.g., number of Pilot Farmers trained did not benefit project management as much as quantitative information might have; and many of the Objectively Verifiable Indicators in the project Logic Framework were in fact not objectively verifiable.

#### Recommendations

(1) If the implementation period of an agricultural development project must be reduced, the scope of the project should also be reduced. As agricultural development requires changing the thinking and practices of farmers, the process cannot easily be accelerated.

(2) Bottom up management strategies should be employed to the fullest extent possible which is consistent with the abilities of the target population and the project managers.

- (3) Emphasis on farmers' groups should be encouraged, particularly agricultural producers' groups.
- (4) Superintendants should delegate more responsibility to project managers.
- (5) Superintendants should be provided with a small discretionary fund (10,000 to 20,000 Baht) to finance small special projects or to cover minor costs which were not anticipated in the budget.
- (6) Extension agents should receive more practical (as opposed to theoretical) training.
- (7) The present staff of agricultural extension agents should be maintained in the project area for another two to three years.
- (8) Volunteers (PCV and/or VSO) should be utilized in future development projects. Generalist volunteers are probably most suitable. Although there will inevitably be some degree of friction between the volunteers and Thai officials, this friction is generally mutually beneficial.
- (9) Expatriot technical advisors should be employed in future development projects; however, the role of the advisors must be clearly defined and agreed to at start of the project.
- (10) Qualitative analysis of project success should be included as well as quantitative measures.
- (11) Baseline surveys and other measures of target population felt needs and actual needs should be accomplished before the basic project plan is developed.
- (12) Objectively Verifiable Indicators included in the Logical Framework of a project should all be truly objectively verifiable.

E. Replication

Conclusions:

(1) The overall methodology of the project is replicable (given sufficient funding) and will probably be replicated in other settlement development projects in the Northeast with some modifications, e.g., the Land Settlements Division will likely attempt to minimize the use of other than DPW staff in project implementation. There is no indication that this project methodology was provided to any other RTG agency; hence, any replication by other agencies would be purely coincidental.

Recommendations:

(1) Replication of the project methodology with the modifications noted in this report is recommended including involvement of volunteers (PCV's and VSO's). Use of expatriot technical advisors is recommended with the provision that the role of the advisors be clearly delineated and understood. Having all technical expertise come from within one government agency is likely to result in reduced creativity. Even the most dynamic organization periodically needs to be stimulated by outside ideas.

(2) Descriptions of the methodology of this project and the results of use of that methodology, e.g., this evaluation report, should be translated into Thai and distributed to other RTG agencies to encourage replication of the methodology.

F. Data Collection

Conclusions:

(1) Overall, the survey data collected for the evaluation of this project were appropriate and of good quality and the team finds that the analyses undertaken by the KKU research team were well-done and will prove useful to interested parties. The benefits of having collected the data would have been enhanced, however, by having had more time and resources available for more thorough analysis.

(2) Due to a reduction in the scope of data collection for the follow-up survey, an opportunity to acquire deeper insights into living conditions and the economics of the project land settlements has been missed. For example, the number of individuals interviewed for the follow-up survey was sufficiently small to effectively preclude meaningful analysis of data on each project settlement individually.

(3) Project planning was accomplished without benefit of sufficiently detailed sociological/agronomic/economic surveys of the specific felt needs and actual needs of the target population.

(4) Due to the lack of a suitable "control" population and the fact that the project was not "targeted" within the project land settlements, the quasi-experimental research design used in this study was not particularly effective.

Recommendations:

(1) In project evaluations measuring project effects and impacts, the collection of "before and after" project implementation data is encouraged. It should be recognized in advance, however, that this will typically require a somewhat larger commitment of resources over a longer period of time than would a "one-shot" post-project implementation evaluation effort. In any

event, sufficient time and resources should be devoted to the analysis of data. If this is not provided for, the utility of undertaking the data collection activities is diminished.

(2) Quasi-experimental design studies should not be attempted without careful appraisal of the nature of the project and the population(s) in which the study is to be carried out. This research design is not especially useful unless there is clearly defined control population which will be subjected to at most minor "extraordinary" stimuli during the study period and when the project intervention is to be relatively highly targeted. At minimum, the intensity of "exposure" to the project under evaluation and other extraneous influences for the "experimental groups" must be well documented in order for the findings of this type of study to be meaningful.

(3) In designing evaluation studies, the degree of initial differences among sub-groups in the population under study should be assessed carefully to determine whether useful information can be obtained by monitoring the sub-groups separately. In this project evaluation, it is likely that valuable insights could have been gained through the examination of differential success rates for the eight project land settlements and the factors responsible for the differential rates of success.

(4) If empirical data are to be used by project evaluation teams, the data should be available in a suitable form at an early stage of their work.

(5) The data collected and supporting documentation prepared for this project should be made available to RTG agencies and other researchers for further analysis. To facilitate this, the final report of the KKU research team should be translated into Thai and should contain some indication that further use of these data is encouraged. The KKU research report should be as widely distributed as is feasible to promote this.

(6) Project monitoring/evaluation data collection activities should begin early in the project implementation period and (despite the recency of implementation) should emphasize assessing the effectiveness of project components. This will facilitate making required mid-project adjustments which might enhance the overall impact of the project.

(7) In conducting mid-project evaluation, a line of communication should be established with key decision makers in the implementing agencies to facilitate action being taken in response to evaluation findings.

(8) While data collection systems for "monitoring" and "evaluation" are rarely fully compatible, increased coordination of the informational requirements of the two types of systems will likely result in improved information for both project management and effect/impact evaluation purposes.

## PART II. DETAILED FINDINGS

### A. Beneficiary Participation

The first item in the scope of work is as follows:

One of the main hypotheses of this project was that maximizing beneficiary participation in the selection and implementation of sub-project activities would result in better management and utilization of scarce local resources and provision of an organizational base for continued "bottom up" development activities. Is there any evidence to support this hypothesis?

The team divided this item into the following key questions for analytical purposes.

1. Was beneficiary participation maximized in the selection and implementation of sub-project activities?
2. Did beneficiary participation result in better management and utilization of scarce local resources?
3. To what extent was an organizational base for continued "bottom up" development created?

Each of the three questions is answered in turn below:

1. Was beneficiary participation maximized in the selection and implementation of sub-project activities?

Surveys of farmers' desires by project staff plus feasibility/practicality surveys by architecture and engineering firms were used to select roads to be improved. This degree of beneficiary participation is considered satisfactory. The quality of the participation probably suffered due to the shortened project implementation period in that the project implementation staff had limited time to discuss with villagers the relative value of potential benefits of alternative roads.

As called for in the initial project design, roads were constructed by contractors with no beneficiary participation. There was virtually no input required from the villagers in terms of either labor or cash/kind inputs.

(Villagers were even paid for the latterite soil taken from their village to build the roads.) Because of this, villagers would have had incentive to request and/or agree to virtually any road construction suggested by the project management even if the villagers perceived the road's potential economic or social value to be minimal.

Villagers made the preliminary selection of sites for water projects. Final selection of sites and detailed project design was accomplished by architecture and engineering (A and E) firms, which also conducted technical feasibility studies. The need to accelerate project implementation probably had a deleterious effect on beneficiary participation in site and project selection, e.g., the potential benefits of projects may not have been fully explained to the villagers. For example, in Ban Pla Lo, Lam Nam Oon Settlement, two large ponds had been constructed a few hundred meters apart. The upper pond drained directly into the lower through a connecting stream. The village headman had planned to use the upper pond for watering buffalo and cattle, the lower pond for drinking water until the evaluation team pointed out the undesirable side effects of drinking water contaminated with livestock waste. The headman agreed that reversing the planned use of the ponds would be a good idea.

In accordance with project design, construction of ponds and deep wells was done by contractors using heavy equipment. Most shallow wells and rain water storage tanks were also built by contractors, (with the exception of some PCV/VSO projects). That is to say, the projects were awarded to contractors. In fact, the construction firms usually hired villagers to do the actual construction under contractor supervision. The upshot is that villagers were paid to construct their own wells, and an opportunity to increase their pride in the wells was lost. Instead, the lesson villagers got was that they should be paid to help themselves.

Water tanks in the villages were built by contractors. These tanks could have been built by the villagers themselves at less cost with support (concrete forms, perhaps cement) from the project which would have given the villagers more pride in the finished product. In some villages in Ubonrat

Settlement, water storage tanks had been constructed by villagers with only minimal assistance from rural developer Meechai Viravaithaya's projects. Similarly, in Ban Kham Nang Oak, Kham Soi Settlement, residents had already installed a main water pipe to bring household water to the village. All work on the project (including payment of Baht 200 per household for inputs) was accomplished by villagers. The Land Settlement project planned to upgrade that system and install smaller pipes to several centrally located spigots in the village. Instead of providing necessary inputs to villagers who had already proved their ability and letting them do the construction work, the entire job was assigned to a contractor. It must be noted, however, that contractors generally can accomplish such projects more quickly than villagers, and, due to the acceleration of the project completion, time was of the essence in infrastructure projects. Thus the opportunities for beneficiary participation were curtailed to some extent by time constraints.

In the case of agricultural training/extension, beneficiary participation in sub-project selection was quite good. A number of potential training courses were identified by the project staff based on felt and actual needs of the target population. These courses were then explained to the farmers in each village at an annual meeting. Farmers then indicated which special agricultural training they wished to receive from the "menu" of available courses. The "menu" included such topics as chicken raising, rice production, vegetable production, kenaf production, etc. (See Annex G for a list of agriculture sub-projects.) From those indicating a desire to receive particular training, individuals were selected to be Pilot Farmers.

The only weak points in this system were the relative lack of experience of the extension agents tasked with explaining the nature of the various courses to the farmers and the training itself appeared to have been overly oriented toward classroom instruction, with insufficient "hands on" training provided. "Learning by doing" was not sufficiently emphasized in many cases.

As part of some of the Pilot Farmer training courses, trainees were brought to see demonstration agricultural activities at other locations. The objective was to show the farmers a successful operating model of the subject

on which they had been trained. This was intended to both instruct and motivate the trainees, however, in practice, the opposite was often the case as many of the field trips were to government operated project. Trainees, upon seeing the government projects, said in effect, "Yes, that's an interesting project, but we can't do it ourselves. The government officials can do it because of their greater knowledge and resources." Thus, field trips to government projects were, in fact, often demotivating for farmers. Had the trainees been provided field trips to projects operated by farmers like themselves, the benefits of the training would likely have been much enhanced.

### Conclusions:

(1) Overall beneficiary participation in selection of sub-project activities was maximized to the extent possible under the less than ideal circumstances. Specifically, participation probably could have been enhanced had the implementation period of the project not been shortened by two years. In addition, the lack of experience of the agricultural extension agents probably had a deleterious effect on the degree of beneficiary participation in selection of agriculture sub-projects.

(2) In accordance with the project design, construction of roads, weirs, ponds and deep wells was performed by contractors using heavy equipment with no beneficiary participation. Most shallow wells and rain water storage tanks were also built by contractors. In some cases, contractors hired local villagers to work as construction laborers. In effect, the villagers were paid to participate in a project of which they were the beneficiaries.

(3) Beneficiary participation in implementation of agricultural sub-projects was quite adequate. Pilot Farmers, the 10% of farmers selected to receive training seemed to freely pass along their new knowledge to the 90% of farmers who did not receive training. Only two weak points were observed. First, the training courses themselves could have benefitted from the inclusion of increased practical "hands on" components. Second, field trips

to let trainees view successful operation of the course subject matter were too often to government operated projects rather than to actual farmers' fields.

Recommendations:

(1) Infrastructure projects should include some element of beneficiary participation (labor and/or capital) in the implementation to act as an acid test of the beneficiaries' desire for the project and to increase the beneficiaries' feeling that the project is "theirs" and not just a gift from the government. The level of beneficiary "investment" required should be enough so that it is perceived as such by the beneficiaries, but not so large as to constitute a burden.

(2) Training courses should include significant practical "hands on" components where farmers actually practice the new methods they have learned.

(3) Field trips for trainees to observe agricultural operations should be to the farms of successful farmers, not to government run and managed stations. The trainees would likely be more motivated by seeing successful private farmers than by seeing government facilities.

2. Did beneficiary participation result in better management and utilization of scarce local resources?

As the degree of beneficiary participation in road projects was limited to selection of locations for roads, participation in this project component probably had little effect vis-a-vis improvement of management and utilization of scarce local resources. There may have been (and probably was) an improvement in utilization of resources due to the roads sub-project, but it did not come from beneficiary participation.

The same situation obtained for most water projects, i.e., as beneficiary participation was largely limited to selection of project sites, it had little or no effect on the management of scarce local resources. With the possible

exception of some of the larger ponds which in a number of cases villagers did not appear to be particularly interested in, water projects generally appeared to have resulted in better resource management. It must be noted, however, that water projects were just completed during the previous dry season. As the project evaluation took place in the following rainy season, the water projects (including the wells) had not yet had an opportunity to prove their value to the target population.

Both shallow and deep wells and rain water tanks in nearly all cases were very much appreciated by villagers. The new facilities saved the villagers considerable time and effort in obtaining water for household use. There were indications that villagers would maintain the wells adequately by themselves. In addition, the well water/rain water was often cleaner than water from traditional sources, so these projects should have a positive effect on villager health. However, as with roads, these results were generally not due to beneficiary participation. It should be noted as well that the evaluation team did not include a civil engineer, so no technical evaluation of infrastructure sub-projects was not attempted.

The level of beneficiary participation in agricultural development sub-projects was quite high and probably resulted in improved utilization of scarce local resources. This improvement was evidenced in many ways including increased cropping intensity and increased crop diversification. The former helps reduce the need for additional farmland and the latter tends to increase the overall health and well-being of the farmers through improve nutrition.

An area where beneficiary participation can make a very important contribution to utilization and management of scarce resources is in the area of soil conservation. Poor soil quality was ranked as the second most important problem (after lack of water) by farmers in nearly all villages. The project design realized this, and many reasonably well designed soil conservation projects were implemented. The problem is that even correctly implemented soil conservation measures, e.g., contour strips, terraces, barrier ponds, do not show immediate and obvious benefits. The benefits begin to become evident only after a period of two to three years. During those two to three years, efforts must be extended to maintain the conservation projects even though no obvious benefits accrue. Farmers everywhere are loathe to extend effort for several years if they have not seen for themselves the benefits which the extension agents have promised. As they say, "farmers have

no ears, only eyes." If the extension agents are continued for two or three more years, beneficiary participation--and improved soil resource management--can be reasonably expected. If not, this very important potential benefit will likely be largely lost.

Soil conservation projects, village improvement projects, in fact, all aspects of development are generally more successful in villages where the local leaders are dynamic and effective. Realizing this, the project design included a Farmer Leader component. Project participants selected to be Farmer Leaders received seven days of leadership training in Kampangsan. As the individuals selected were chosen based on their previously demonstrated leadership ability, it was difficult to ascertain what portion of the leadership ability observed by the evaluation team was a result of the project training and what was preexisting ability. Thus the effects of beneficiary participation in this area vis-a-vis scarce resources (leadership) is not immediately evident. In any event, the motivational effect of the training was probably valuable in terms of village leaders having a positive attitude toward the project in particular and development in general.

#### Conclusions:

(1) As beneficiary participation was limited to selection of locations for road projects and villagers had to make no investment in the actual construction, little of the probable improvement in management and utilization of scarce resources resulting from road construction could be ascribed to beneficiary participation.

(2) Most of the water sub-projects (with the exception of some of the larger ponds) appeared to have improved management and utilization of water resources. However, as with roads, as beneficiary participation was limited to construction of only a small proportion of the wells, most of the resource management gains cannot be ascribed to the beneficiary participation with any reasonable degree of certainty.

(3) There were signs of improvements in resource management/utilization resulting directly from beneficiary participation in agriculture sub-projects, e.g., increases in cropping intensity and crop diversification. These gains, however, could be largely lost if the agricultural extension agents are not allowed to remain in the project area for another two or three years.

(4) Poor soil quality was a major problem in most villages. Beneficiary participation in soil conservation projects was just beginning to show the first signs of improvement in soil resource management. If these gains are to be consolidated and expanded, it is imperative that the agricultural extension agents remain in the area for at least two or three more years. If the agents are withdrawn prematurely, the fledgling soil conservation efforts would probably be abandoned.

(5) Beneficiary participation in the Farmer Leader program was high; however, as individuals selected for the program were chosen based on their previously demonstrated leadership ability, it was difficult to ascertain what portion of the leadership ability observed was due to beneficiary participation and what was pre-existing ability. In any event, the motivational effect of the Farmer Leader program was probably substantial in terms of village leaders having a positive attitude toward the Land Settlements Project in particular and development in general.

Recommendations:

(1) Continue all agricultural extension agents in the project areas for at least two to three additional years.

(2) Beneficiaries should be required to invest some of their own capital and/or labor in infrastructure projects.

3. To what extent was an organizational base for continued "bottom up" development created?

The extent to which a base for continued "bottom up" development was created cannot yet be fully evaluated. There was little base for continued

"bottom up" development created in the area of infrastructure construction, with the exception of those relatively few water projects in which villagers actively participated; however, the nature of the project design indicates that development of such a base in the area of infrastructure was not a specific goal of the project.

There are preliminary indications that the beginnings of a true organizational base for continued agricultural "bottom up" development activities was created. The solidity of that base will depend in large measure on the number of agricultural extension agents the Welfare Department continues to assign to the settlements after the project is terminated. The foundations for an organizational base have been laid: many farmers have seen that changes can occur in their production methods. What they now need to see is that those changes will result in long term benefits--benefits in which the farmers themselves share, i.e., the farmers need to see that the benefits will not all be absorbed by middlemen and other merchants.

Existing informal farmers' groups could have been used to help establish a base for continued "bottom up" development activities, but these existing groups appear not to have been exploited to any great extent. The fact that many of the existing groups were based on extended family relationships appears to have been a deterrent to utilizing those groups to accomplish project goals. Even newly formed groups could probably have helped establish the "bottom up" base, but relatively little was done to encourage the formation or strengthening of such groups.

The Pilot Farmer program, although not a group per se, did help establish the base. Each Pilot Farmer who received training was expected to share his newly acquired knowledge with other farmers. The degree of sharing appeared to be adequate in most cases. Production of improved variety rice was particularly successful: in most villages where Pilot Farmers received rice production training and free inputs (rice seed, fertilizer, pesticides), the following year they shared both their knowledge and their seed with other villagers. The upshot was that where new rice varieties were introduced, within a year or two nearly the entire village was planting the new varieties. This concept of a few farmers receiving training then sharing

their newly gained knowledge is an excellent base for future "bottom up" projects.

"Outside" help, too, assisted in establishing a development base. In many of the villages where Peace Corps Volunteers or Volunteers in Service Overseas (PCV/VSO) had been stationed, both the villagers themselves and the agricultural extension agents were quite pleased with the contribution of these individuals. As assessed by the evaluation team, one of the major areas in which the PCV/VSO contributed was in the social aspects of community organization, a contribution which directly works to strengthen the ability of the community vis-a-vis future "bottom up" development activities.

#### Conclusions:

(1) Little organizational base for continued "bottom up" development activities was created as a result of the infrastructure projects due to the minimal amount of beneficiary participation in project implementation. However, establishment of such a base in the area of infrastructure was not a specific goal of the project.

(2) The foundations for a "bottom up" development base have been laid in the area of agricultural development, although little use of farmers' groups was made in this regard. Another two or three years of strengthening of the base through intensive agricultural extension activities are needed, however, if the base it is to become permanent.

#### Recommendations:

(1) If a base for continued "bottom up" development activities is desired in the area of infrastructure, an element of beneficiary participation in implementation as well as site/project selection is a good way to help achieve that objective.

(2) The agricultural extension agents assigned to the project should remain in place for at least two to three years to solidify the agricultural development "bottom up" development base.

B. Inputs Equal Self-Sufficiency

The second item in the scope of work was as follows:

Another project hypothesis, broader than "A" above, was that the provision of basic infrastructure (i.e., roads, water supply) in combination with appropriate agricultural technology, farmer organizations and land allocation were sufficient pre-conditions for people to (i) at least obtain self-sufficiency and (ii) possibly raise their standard of living. The project's B/C and IRR analysis concluded that the project had acceptable investment returns. The evaluation team should review the economic analysis and sensitivity analysis and comment on whether the investment had reasonable returns to the (a) economy, (b) beneficiaries. It should be noted that since most of the project construction work was completed near the end of the project, there has been insufficient time for the infrastructure element to have had any significant impact on the villager's living conditions. The team may have to use proxy indicators or other methods to estimate future impact of the construction activities. The evaluation team should use available data, interviews etc. to find evidence to support or question this hypothesis.

The team should also note that although the project data collection activities were not designed to show the relative contribution of each project component, i.e., roads, water resources, agricultural extension, training, etc., it would be useful if the team can find evidence of relative importance of one component versus the other project interventions. Such information could be used by the RTG in making management decisions concerning in the relative returns on investments related to various rural intervention options.

The team approached this item by dividing it into three sub-questions, which it felt could be focussed in upon more readily. These were as follows:

1. Were the project inputs sufficient for the settlement populations to (a) at least obtain self-sufficiency and (b) possibly raise their standard of living?
2. What were/will be the relative contributions of the various project components?
3. Did/will the investment have reasonable returns to (a) the economy and (b) the beneficiaries?

These issues are addressed below in this order.

1. Were the project inputs sufficient for the settlement populations to (a) at least obtain self-sufficiency and (b) possibly raise their standard of living?

Before it could address this question, the team found it necessary to reconcile the use of the term "self-sufficiency". The team finds the use of the term "self-sufficient" in the context of the Land Settlements Project to be largely rhetorical in several respects. Indeed, one of the major problems that the project sought to address was the fact a large population (many of them squatters) were living in the land settlements without the benefit of basic RTG services. This fact alone would seem to imply that the settlers were already self-sufficient, albeit in a condition of relative poverty. It is also worthy of note that the land settlements were set up by the Department of Public Welfare (DPW) as "self-help" land settlements, meaning that for all intents and purposes settlers took up residence in the settlements with the expectation that they would have to be self-sufficient (especially in view of the limited budget available to the DPW to provide assistance to so large a population).

The team considered one potentially workable operational definition of the concept of self-sufficiency to be the "graduation" criteria formulated by the DPW for land settlements to be turned over to their respective provincial administrations. The team felt, however, that this operationalization was too narrow and "administrative" in nature vis-a-vis what the team perceived to be the primary thrust of the item in the scope of work.

The team reached consensus that a more fruitful line of inquiry was to view the problem not as one of self-sufficiency, but rather as one of sustainability: in the situation prevailing prior to project implementation, increases in agricultural production in the settlements were achieved largely (if not exclusively) through the expansion of land under cultivation (essentially "slash and burn" agriculture). Due to limits on the amount of land which had not yet been brought under cultivation, limited water resources, increasing environmental degradation, and declining soil fertility,

it is unlikely that the land settlements could have supported the current or higher population levels at even the current standard of living over the long term under the prevailing agricultural regime. In other words, the prevailing regime was not sustainable in the long term without some form of adjustment between population and resources.

Framed in these terms, the key issue for the team to consider is whether the project contributed to the sustainability of the project land settlements at current or higher population levels. The project sought to accomplish this by increasing the "carrying capacity" of the land in the project land settlements through the transfer of appropriate agricultural technologies (including improved soil and water conservation practices), selected improvements in infrastructure (i.e., roads and water), and the development of an organizational base for further development activities.

With this refinement in the scope of work accomplished, the following are the teams findings:

With regard to the issue of whether the project contributed to the sustainability of the land settlements, the team finds considerable evidence that some progress toward sustainability has been made and that it may to a large extent be attributed to the project intervention. The team bases its assessment largely upon the data collected in the household surveys conducted by Khon Kaen University. Among the indications of improved sustainability evident in these data are:

- (a) An increase in the intensity of agricultural production activities, as exemplified by an increase in the average number of months in which the farmland of settlement farmers was under cultivation (from an average of about 8.8 months to about 9.4 months in the three year period covered by the two rounds of surveys),
- (b) Increased crop diversification as evidenced by a significant increase in the proportion of settlement farm households growing "minor crops" such as sugar cane, kenaf, peanuts, pumpkin, chili, and vegetables,

- (c) A significant increase in both the proportions using and in the average volume of fertilizer and pesticide used by settlement farm households during the 12 period preceding the followup period as compared to the corresponding period preceding the baseline survey,
- (d) An increase in the prevalence of farm management practices such as dry season cropping and inter-cropping, and
- (e) Significant increases in crop productivity (production per rai planted) for three of the major crops grown in the settlements (glutinous rice, non-glutinous rice, and cassava) for the group of villages receiving the most intense project attention (labeled "Project Villages" by the KKU researchers).

Under the research design employed by the KKU researchers, project effects and impacts were measured by comparing changes in key indicators for two groups of villages in the project land settlements, one of which received more intensely administered project benefits ("Project Villages") than the other ("Previously Allocated Villages"). The latter group served as a "control" group for effect/impact attribution purposes. The team attributes a significant portion of the changes noted above to the project intervention on the basis of generally larger changes in the "project" group of villages than in the "control" group.

The team notes, however, that attribution of observed changes to the project was made somewhat tenuous in the KKU study by the absence of a control group which received no project benefits. (This issue is discussed in greater detail in the teams' consideration of the final item in the scope of work). As a result, it is difficult to judge how much of the change observed for the "control" group was due to: (1) the limited direct project benefits received by this group, (2) a "spread" effect resulting from project implementation in the Project Villages, and (3) changes that would have occurred irrespective of the project. Accordingly, the comparison of changes in effect/impact indicators for the experimental groups could lead to either an overestimate or

underestimate of the portion of the observed changes for the Project Villages attributable to the project intervention, depending upon which of the factors cited above is the most prominent.

While the team has no further quantitative evidence to support its conclusion, the team is reasonably convinced based upon careful study of the survey data collected and observations made in visits to the project land settlements that a significant portion of the observed changes in effect/impact indicators in both "project" and "control" groups may be properly attributed to the project (i.e., these would likely not have occurred in the absence of the project). Differences between the groups with respect to the rate of change in indicators are felt by the team to be reasonable estimates of the effects/impacts attributable to more intense project administration in the "project" as compared to the "control" villages.

As noted by the KKV researchers, however, there are a number of important qualifications of these findings revealed by the survey data which bear directly on the issue under consideration here (i.e., sustainability of the land settlements).

First, with regard to the indications of increased crops diversification, it is worthy of note that this appears to have taken place on a small-scale, low-intensity basis (i.e., in small plots and with minimal investment by settlement farmers in terms of time or agricultural inputs), the result being that the overall land use pattern in project land settlements was not altered significantly during the project period. A majority of settlement farmers remain heavily dependent upon rice paddy cultivation for subsistence.

Second, while evidence of significant increases in the volume of agricultural inputs used by settlement farmers is observed in the survey data, the application rates remain on the whole significantly below the rates prescribed by the project technical advisers and agricultural extension agents.

Third, while increases in the proportions of settlement farmers engaging in practices such as dry season cropping and inter-cropping were observed in the survey research findings, the team observes from the detailed survey data and from field visits that these are also for the most part small-scale undertakings involving only marginal changes in overall farming methods. Dry season cropping remains overwhelmingly a one-crop enterprise (field corn), although the growing of vegetables is becoming more prominent.

Finally, with regard to improvements in crop yields, it should be borne in mind that the two crop years to which the survey data refer (March to April 1980/81 and 1983/84, respectively) were both years in which climatic conditions were favorable for rainfed agriculture. While differences in the amount rainfall is not a plausible explanation of the observed improvement in crop yield (there was more rain in the 12 month period preceding the baseline survey than in the corresponding period preceding the followup survey), it remains to be seen whether production increases can be maintained under more stressful conditions.

Accordingly, our overall conclusion is that the project has at minimum lengthened the sustainable period of agriculture in the project land settlements. The long term prospects, however, remain uncertain since the technological changes introduced by the project have not yet had sufficient time to mature.

As the second part of the issue under consideration, the team was asked to assess whether the project inputs were sufficient to have raised the standard of living of settlement farmers. The team finds evidence, once again based largely upon the survey research conducted by the KKU research team, that the standard of living of settlement farmers has been marginally improved during the project period. The primary indications of this are:

- (:) An increase in real median gross household income (assuming an inflation rate of 7 percent) for Project Village households of about 29 percent during the three year study period (as compared to 11 percent for the Previously Allocated or "Control" Villages),

- (b) Evidence of marginally increasing diversification with respect to sources of income for settlement households, and
- (c) Moderate increases in the mean number of household items (electric appliances, household implements, etc.) owned by settlement farm households.

Caution is advisable, however, in drawing firm conclusions from these findings for several reasons. First, the data provided by the KKU researchers measured changes in gross household income, which do not reflect the increased cost (over and above the rate of inflation) of agricultural production that are certain to have been encountered by settlement farmers during the project period. These incremental production costs are the result of: (1) increases in the amount of land under cultivation per farm household, resulting in increased costs for labor and agricultural inputs, (2) increases in the use of rented land for agricultural production purposes, resulting in increased "overhead" costs for the use of land (either in the form of cash or farm product payments), and (3) sharply higher expenditures on a per household basis for agricultural inputs (fertilizer and pesticide).<sup>\*</sup> As a result, the increases in real gross household income estimated from the survey data are certain to be higher than the increases in real net household income, perhaps by a considerable margin. Regretably, the team has no firm basis for estimating these incremental costs. Nevertheless, the team agrees with the KKU researchers in concluding that the project-period change in real net household income for the Project Villages was very likely to have been positive.

A second factor entering into the teams' cautious position on the issue of the magnitude of project-period improvements in standard of living is that it is quite difficult to evaluate trends with data collected at only two points in time. As mentioned previously, the two reference crop years in the KKU surveys were both good years from a climatic point of view. The year

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<sup>\*</sup> These observations are based upon the KKU survey data and were also noted by the KKU researchers.

preceding the reference year for the followup survey, however, was substandard in terms of rainfall. There is the very real possibility that a substantial proportion of the increased flow of gross income from increased agricultural production in the reference year for the KKU follow-up survey may have been used by settlement farmers to repay debts incurred in the previous (substandard) crop year, and hence were not available to improve standard living to the full extent suggested by the data showing project-period improvements in levels of real gross household income. In short, the team is unable to draw firm conclusions as to the magnitude of improvements in standard of living without more detailed information on household income and expenditures for more than two points in time.

Nevertheless, the preponderance of evidence available to the team points to some, but likely not substantial, improvement in standard of living for project beneficiaries during the project period.

#### Conclusions:

- (1) The project (in a relatively short period of time) has contributed to the sustainability of agriculture in the land settlements. Largely as a result of the project, farming methods which raise production levels, reduce the need to bring additional land under cultivation, and reduce reliance on one or two crops have begun to be adopted by settlement farmers.
- (2) Despite this, the team is uncertain as to whether the agricultural system prevailing at the end of the project is sustainable over the long term. Changes in farming practices adopted to date by settlement farmers have been adopted on a small-scale, low-intensity basis and consist largely of practices which can be readily accommodated within the prevailing agricultural regime. Settlement farmers have not yet adopted the recommended technologies in sufficient numbers or with sufficient intensity to ensure sustainability.
- (3) There is evidence of a marginal improvement in standard of living among project beneficiaries during the project period.

The second question to be considered in this item of the scope of work is:

2. What were/will be the relative contributions of the various project components?

Although there is relatively little empirical evidence available with which to address this question, the team felt that it had acquired a sufficient appreciation/understanding of agricultural conditions in the project land settlements and project components through field visits, interviews, and review of survey data and project documents to make some general observations. It is to be noted, however, that these observations are made on the basis of admittedly incomplete information.

In addressing the question, the team considered the following categories of project components: (1) land registration (i.e., security), (2) agriculture extension and training, (3) water resource development, and (4) road construction. Agricultural extension and training were combined into a single category based the teams' view that the effects/impacts of these two project activities would be qualitatively similar in nature. The teams observations regarding actual (i.e., during the project period) and anticipated contributions of each component group are presented separately below.

#### Relative Contributions During the Project Period

Due to the delay in project implementation, the road construction and water resource development project components were not implemented until the final year of the project period. It is noted in the scope of work that because of this "there has been insufficient time for the infrastructure element to have had any significant impact on the villagers living conditions." Nevertheless, the team considered evidence of either a direct or indirect nature of project period effects attributable the these project components.

With regard to water resources, the team finds the assessment in the scope of work to be largely on target. There is little evidence that the

water resource improvements funded by the project had any notable effect on agricultural production during the project period, largely as a result of having been in place for only a small portion of this period. The KKU survey data support this observation. While some increases in the proportion of land settlement farm households engaging in several water-dependent activities were observed during the three year study period, only a small percentage of this increase would appear to be based upon the use of water sources of the type funded by the project. With the exception of fish-raising, most farmers engaging in the activities considered (i.e., dry season rice nursery, growing vegetables, double rice cropping, growing fruit trees, raising fish, and growing mulberry) depend upon rainfall, rivers and canals, etc. It is possible that the increase in the prevalence of fish-raising (which was undertaken primarily in dug ponds) might be attributable in part to the project. It is also likely that some benefits were realized in the final year of the project from project-funded water resource development activities in the form of improved access to water for household uses. Overall, however, the team concludes that the contribution of the water resources project component during the project period was relatively small.

An overall similar conclusion was reached by the team as concerns the road construction component of the project. The team notes that the KKU survey data indicate a minor shift toward increased incidence of marketing of several crops outside of the settlements, an increase in the average number of trips made by settlement farm household heads to market, and an increase in the average number of visits received from dealers by settlement farm households. While the team feels that some (but not all) of these changes may be attributable to project-funded road construction, benefits from these activities would have accrued to settlement farmers in only the last year of the project period.

The team also considered possible indirect benefits of the new roads. One possibility considered was a change in cropping patterns in anticipation of the new roads. While it is conceivable that cropping patterns could have been modified on a limited basis in anticipation of lower marketing costs (and

higher profitability) due to new roads, this type of advance planning and management seems at present to be relatively rare among settlement farmers. Further, the team finds no evidence that the construction of new roads was used by project staff as "leverage" to initiate changes in farming methods/cropping patterns.

On the basis of the available evidence, therefore, the team concludes that the relative contribution of the road construction component of the project during the project period was modest (at best), although probably larger than that of the water resource development component.

The third project component, land registration, was intended to legitimize the de facto control over land in the project land settlements by the sizeable squatter populations. Under the project, the pace of the process under which squatters were issued certificates designating qualification to receive full tenure rights to occupied land was to be accelerated. It was hypothesized that the probability of squatter residents' making long-term investments in land improvements would be greatly enhanced by legitimizing their occupation of land in the project land settlements.

The team finds little in the way of evidence of short-term benefits from this project component. Several points in connection with this component warrant mention, however. First, the benefits from legitimized land tenure arrangements were not intended to be short-term in nature, but rather to accrue over the long term as the implications of land security became recognized by the former squatter populations. This point is especially relevant in view of the shortened project period. According to DPW statistics, for example, nearly 41 percent of the target population had not been provided land registration certificates as of 31 August, 1984, and thus had not had an opportunity to benefit from land ownership for any significant period of time. (It should be noted, however, that land titles for this 41 percent of project households are either approved but not distributed, under consideration by DPW or being processed at the settlement.)

In addition to this, the very nature of the arrangement under which settlement farmers were to obtain clear title to land has likely contributed to the absence of short-term benefits. Under the process implemented by the DPW, farm households which met specified requirements were issued a certificate of qualification for land title (NS.3). The farmers were then required to hold the certificate for five years, during which time they were also required to cultivate the land and make other improvements (e.g., construct a house and fence-in the land). During this five year period, however, recipients of land certificates were prohibited from transferring title to their land for five years. This limited the use of the land for obtaining credit with financial institutions (other than BAAC and agricultural cooperatives), somewhat limited the recipients' ability to intensify productive practices (at least in the short run).

Finally, with regard to agricultural extension/training, the team finds that a significant proportion of the changes observed to date are attributable to this project component. This finding is consistent with expectations as set out in Project Paper. The team notes that considerable progress has been made through this project component, particularly in view of the shortened project period.

#### Expected Future Relative Contributions

The team also considered the likely magnitude of future contributions of the various project components. In order to facilitate integration of these observations into the team's assessment of the project's IRR and B/C ratio, presented in the final section under this scope of work item, the team adopted the same 15-year planning horizon used in the Project Paper's economic analysis. The following are the team's observations.

Under the assumption that the project agricultural extension agents will continue working in the project land settlements for 2 years after the end of the 5-year project period and with more or less the same priorities as during the project period, the team feels that this project component will continue to provide the largest returns in the long term. The assumptions stated above are pivotal, however, since the team feels that an insufficient level of technological change will have taken place by the end of the project period to otherwise justify this observation. In addition to promoting "deeper"

technological changes among farmers who have adopted some of the advocated farming practices and initial changes among farmers who have yet adopted the new technologies, the team views it as vital that extension agents be available to help resolve the problems that will inevitably arise when new methods are introduced. This is essential so that farmers do not revert to traditional practices when faced with problems with which they have no experience in resolving. Given the delay in project implementation, there will have been insufficient time enough for these types of problems to have arisen by end of the project period for the farmers to be sufficiently secure in the new methods.

With regard to anticipated future contributions of the water resources developed by the project, the team has some reservation over projecting a benefit stream as large as that anticipated in the Project Paper. The reasons for this are elaborated in some detail under scope of work item 1, and for the sake of brevity are not re-enumerated here. While it is conceded that inadequate water resources will continue to be a major development constraint in the project land settlements, the team considers the likely future contributions of this project component toward alleviating these problems to be somewhat more modest than anticipated by the project designers.

A somewhat more positive assessment was arrived at by the team with regard to the road construction component of the project. Overall, it is felt that the roads funded by the project will contribute significantly to the development of the project land settlements. While the major portion of the benefits in the short-term are likely to accrue to the economy rather than project beneficiaries (the team feels that the cost of transportation of crops to market to settlement farmers will show less downward elasticity than was assumed in the Project Paper), settlement farmers should benefit somewhat more over the long term due to the improved flow of information regarding market conditions and prices and improved access to different market outlets. Should settlement farmers begin to acquire the means to transport crops to market on their own (as the team sees likely in the not too distant future, in part in response to improved roads), further benefits in the form of reduction of

"middleman costs" and further improvements in the flow of information regarding market conditions might also be realized. The team views the ability to modify the prevailing marketing arrangements in the land settlements to be perhaps as significant an accomplishment as increases in levels of agricultural production.

Further, the team agrees with the assessment in the Project Paper that the externalities associated with project road construction will be significant and positive. Among these are increased social and economic integration within the settlement community and with the regional economy.

Finally, with regard to the long term impact of changes in land tenure arrangements resulting from the project, the team feels that these will be largely positive, but of uncertain magnitude. The team agrees with the a priori assumption that land security should result in increased investment in long term improvements in the land. However, several points warrant mention in this regard. First, since few (if any) squatters have been evicted from land they had occupied in the land settlements in recent years, it is not clear that squatters perceive their situation as being as precarious as might otherwise be anticipated. If this should be the case, then it is also by no means certain that providing squatters with land certificates to land that is recognized (albeit informally) as being under their control to begin with will motivate them to make substantial investments. It may well be the case that insofar as the squatters view the likelihood of the RTG uprooting so large and reasonably entrenched a community as being remote, the formal recognition of tenure is not perceived by settlement squatters as an especially significant event.

Secondly, while clear title to land in the settlements may in fact result in increased levels of investment in the land, it also enables landholders to control land without actually having to occupy it on a de facto basis. Indeed, the KKV survey data reveal a decline in the number of settlement households in the Previously Allocated Villages (i.e., villagers whose residents had title to their land prior to the project intervention) of about 12 percent during the three year period covered by that study. Inquiries into

this phenomenon by the team confirmed its existence and revealed that land so "abandoned" for own-cultivation purposes was typically rented out in small plots to other farmers wishing to diversify their crops, but who were unwilling to re-allocate some of their own land from "traditional" crops for this purpose.

Accordingly, the long-term implications of legitimization of tenure arrangements in the project land settlements are unclear. One positive development might be that as a result of out-migration of households, increases in the size of landholdings for the purposes of cultivation of the remaining settlement farmers might be possible. To the extent this will improve production efficiency through increased economies of scale, this would represent a positive development. However, the concentration of "abandoned" land in the hands of a small number of "shadowholders" is also possible, which would likely have negative consequences in the long term. The team feels, however, that improved land security alone (i.e., in the absence of other project components) would probably not have had resulted in a significant improvement in the sustainability of the project land settlements.

#### Conclusions:

(1) During the project period, only the agriculture extension/training project component would appear to have had any significant effect on living conditions of settlement farmers. Due to delayed implementation and other factors, the infrastructure development project components (i.e., water and roads) contributed relatively little, although a modest benefit from road construction may have been realized in marketing the harvest of the last crop during the project period. There is little evidence that improved land security affected farming practices during the project period, again due in part to the shortened project period.

(2) In terms of anticipated long term contributions, the team assesses those of the agriculture extension and road construction project components as being the most significant. The present plans for continuation of the

presence of extension agents in the settlements for at least two additional years is critical to this assessment, however. Improved roads are seen as a step toward modifying present marketing arrangements which are considerably less than favorable to settlement farmers. Due to reservations regarding the extent to which a number of the water resource improvements funded by the project meet the needs of settlement farmers for agricultural production purposes, the team anticipates that the long-term benefits derived will fall short of expectations. The long-term impact of improved land security is difficult to predict, since this depends entirely upon what the recipients of the land titles do with the land after receiving title. While overall positive effects are anticipated, the team feels that land security alone would likely not have resulted in the long term sustainability of the land settlements.

The third and final specific question to be addressed under this item of the scope of work is:

3. Did/will the investment have reasonable returns to  
(a) the economy and (b) the beneficiaries?

The team addressed this question in the following fashion. First, we re-assessed the Project Paper economic analysis of each project component (technical agriculture, roads, and water) separately. Second, and based upon the observations for each component, we re-evaluated the results of the IRR and B/C ratio calculations and sensitivity analysis presented in the Project Paper. In making these assessments, the team limited consideration to those "quantifiable" elements entering into the IRR and B/C rates calculations in the Project Paper. Finally, the team evaluated the nature and magnitude of likely "non-quantifiable" project benefits and externalities not included the IRR and B/C ratio calculations in the project economic analysis in arriving at an overall assessment of investment returns to project beneficiaries and the economy.

Due to time constraints, the team did not perform new IRR and B/C ratio calculations, but rather attempted to estimate the extent to which the investment returns projected by the team based upon the evidence to date would

exceed or fall short of those anticipated at the outset of the project. For analytical purposes, the same fifteen year planning horizon used in the Project Paper economic analysis was adopted by the team. It should also be noted that in considering this issue, the team had evidence available for only three years of project implementation and thus had only marginally more information available than did the designers of the project. This should be borne in mind when reviewing the conclusions presented below.

### Economic Analysis of Project Components

#### a. Technical Agriculture

The project designers envisioned that the transfer of agricultural technology would provide the most significant returns among the major project components. The team agrees with this assessment. The team feels, however, that these returns are not likely to be as significant as anticipated in the project economic analysis for reasons articulated below.

The projected benefits deriving from the technical agriculture project component were calculated based upon three major assumptions:

- (1) That cropping patterns in the land settlements would remain the same,
- (2) That 100 percent of the land under cultivation at the outset of the project would be farmed under the technologies introduced by the project, subject to a projected schedule of rates of adoption of the new technologies, and
- (3) That actual crop yields for settlement farmers under the new technologies would be a fixed percentage of the yields obtained in research trials (estimated at 60 percent).

Based upon available evidence, the team has no serious difficulties with the first and third of these assumptions. The KKU survey data are not suggestive of major changes in land use patterns to date, although whether

this will change in the future is subject to speculation. With regard to actual crop yields realized by settlement farmers applying the new technologies, a yield of 60 percent of that obtained in research trials seems reasonable (although some improvement might be anticipated as farmers gain confidence and experience in applying the new methods.)

The team questions, however, the assumption regarding the adoption rates used in estimating benefits. Adoption rates in the Project Paper economic analysis are defined in terms of the percentage of the total cultivated area in the project land settlements expected to be cropped with improved technological practices in any given year. This rate is actually the product of two "component" rates: (1) the rate at which farmers undertake to adopt the improved technologies, and (2) the proportion of their cultivated land on which the new technologies are applied.

Based upon the KCU survey data and observations made by the team in visits to the project land settlements, the team views the schedule of adoption rates used in the project economic analysis in calculating benefits to be a reasonable approximation of the former of these component rates (the implications of delayed project implementation notwithstanding--this aspect is addressed below). The team finds considerable evidence to suggest, however, that settlement farmers adopting the new technologies do not do so fully, but rather do so selectively in terms of specific crops or a portion of their land under cultivation. Given an acceptable return from their initial experiences with the new technologies, it would seem logical that they would eventually apply the new technologies to most or all crops and cultivated areas. However, for a significant portion of the 15 year planning horizon adopted for this analysis, the team concludes that the adoption rates projected in the project economic analysis are unlikely to be achieved.

With regard to adoption rates anticipated by the team, two scenarios are considered. The first scenario would apply if the agriculture extension agent presence introduced under the project were to be terminated at the conclusion of the project period, while the second pertains to the case where

this presence is extended by two years. The team's projections of the ultimate proportion of settlement farmers adopting the new technologies, the average proportion of their cultivated land farmed under the new technologies, and the total proportion of cultivated land in the project settlements under the new technologies for each of these scenarios are as follows:

<u>Scenario</u>	<u>Percentage Adopting</u>	<u>Average PCT of Land Committed</u>	<u>PCT of Total Land under New Technology</u>
1	60	50	30
2	80	70	56

Accordingly, the team projects that the increased agricultural production resulting from the technological agriculture project component (assuming the same trajectory of adoption rates used in the project economic analysis) would be reduced by 42 percent [ $1-(30/80)$ ] under the first scenario (i.e., termination of extension agents at the end of the project period) and by 30 percent [ $1-(56/80)$ ] under the second scenario.

b. Roads

Insofar as a non-trivial portion of the projected benefits of project-funded road construction derived from savings in the cost of market transportation of the incremental crop production resulting from the technical agriculture component of the project, the actual benefits derived from roads as projected by the evaluation team will be somewhat lower than that anticipated in the project economic analysis. The team did not attempt to calculate the magnitude of the reduction in benefits resulting from this. The team observes, however, that the quantifiable benefits from road construction are (despite this reduction) expected to be significant and are supplemented by a variety of non-quantifiable benefits described below.

c. Water

As indicated earlier, the team's assessment of the relative contribution of the water resource development component of the project is somewhat less favorable than that of the technical agriculture and road construction project components. In terms of the quantifiable benefits

considered in the project economic analysis, the team projects that (for reasons indicated earlier in the report) the agricultural benefits deriving from this component are likely to be somewhat less than that envisioned in the project economic analysis. In particular, the team questions the magnitude of the projected benefit in the form of water for dry season vegetables (largely due to the location of wells intended for this purpose observed in visits to the field). It is anticipated that the actual benefits derived in this regard will be at least 25 percent lower. Future reductions in benefit flow from water resource sub-projects are also anticipated by the team due to questionable design and consequential deterioration of some of the ponds. Since none of the team members were engineers, however, no attempt was made to estimate the extent to which the future flow of benefits from water sub-projects would be interrupted by these problems. In addition, it is important to note that the ponds were designed as a dry season water source. As the ponds were only completed at the end of the previous rainy season, there has not yet been an opportunity for their worth to be evaluated. Nevertheless, the team views the projected benefits from this project component in the project economic analysis as being optimistic.

However, in considering the economic analysis of the water resource development component of the project, it should be noted that actual implementation of this project component varied somewhat from that envisioned at the time when the project economic analysis was undertaken. The team was informed that the discrepancy between anticipated and actual implementation is due in large measure to implausible assumptions at the design stage. For example, with regard to the use of wells for irrigation of vegetable plots, the evaluation team was told by the USAID Project Officer and DPW management officials that the assumption that 25 rai of vegetables (1/4 rai for each of 100 farm households) would be irrigated by each of the shallow/deep wells funded by the project was implausible on purely logistical grounds (i.e., the need to choose sites on public land frequently precluded having 25 rai of vegetable plots within reasonable distance of the wells).

The evaluation team recognizes this (and similar) discrepancies between anticipated and actual project implementation to be inevitable in view of the incomplete (and sometimes faulty) information available to project planners and does not find fault in having to change implementation plans. However, insofar as the team has been requested to comment on the project

economic analysis, the team's consensus was that the logical manner in which to proceed was to first compare the team's assessment of returns to investment with those projected in the projects economic analysis taking into consideration the same set of factors, and then to consider additional factors (including those which, in the opinion of the evaluation team, may have been erroneously omitted in the project economic analysis) in arriving at an overall assessment of the project's investment returns.

#### Observations on Project IRR and B/C Ratio

The internal rate of return (IRR) for the project was calculated to be 17.2 percent (assuming a discount factor of 17 percent) and the benefit/cost (B/C) ratio was estimated at 1.06 (with a 15 percent discount factor) on the basis of a fifteen year period for the accrual of benefits and costs (see Annex E of the Project Paper). One of the alternative scenarios considered in the sensitivity analysis presented in the Project Paper envisioned a two-year delay in project implementation. Under this scenario, the estimated IRR was 11 percent. Since project implementation was in fact delayed by about 2 years, this estimate provides a convenient benchmark for analytic purposes.

On the basis of the observations summarized above and considering only those "quantifiable" elements considered in the project economic analysis, the team anticipates that the IRR for the 15 planning period will be significantly below the 11 percent benchmark estimate. Should the presence of the agricultural extension agents not be extended beyond the end of the project period, a quite small IRR is projected by the team. Even with the continuation of this presence, the team anticipates that the IRR is unlikely to exceed 50 percent of the benchmark estimate (i.e. about 5-6 percent). With regards to the B/C ratio, the team envisions that the most positive outcome that could be expected in the 15 year planning period is a "break-even" value of 1.00. It is quite reasonable, however, that costs will exceed benefits during this period, although likely not by a significant margin, again, based on only the quantifiable elements considered in the project economic analysis.

It is important to note, however, that the team anticipates that the benefits of this project should continue to accrue and perhaps even accelerate

after the 15 year planning period has expired. The team feels that the technological changes introduced by the project are likely to form a base for further technological change and economic expansion in the project land settlements from which benefits will accrue over the long-term, and may to some extent be viewed as an indirect benefit of this project. Further, the team feels that other benefits which are not considered in these calculations will accrue to project beneficiaries and the economy, significantly increasing the rate of return for this project. These are described below.

### "Non-Quantifiable" Project Benefits and Externalities

In addition to accruing benefits (both direct and indirect) from this project beyond the fifteen year period considered in the economic analysis presented above, the team anticipates that other short- and long-term benefits not considered in this analysis will accrue both to project beneficiaries and the economy. The team considers that several of these factors are of sufficient importance that they should be properly considered in assessing the overall return to the investment in the project.

In terms of benefits to project beneficiaries, the team anticipates that additional benefits will result from each of the project components. First, with regard to agricultural extension, the extent to which the introduction of new technologies in the land settlements engenders greater receptivity toward technological innovations in the future has been noted on several occasions in this report as being extremely important. Technological change is a process which is inherently self-sustaining once the initial resistance to change has been overcome. The evaluation team finds considerable evidence that this project has contributed significantly to the breaking of the "technological barrier" in the project land settlements as concerns agriculture. If this proves to be the case, then this benefit alone will lead to ascending levels of agricultural production and standard of living and will more than justify the investment in the project.

Second, with regard to project road construction, the team feels that the project contributed toward improving the long-term position of settlement

farmers in the marketing area, which (as noted earlier) is at present considerably less than favorable to settlement farmers. In the middle- to long-term, the team views this an aspect whose importance approaches that of increases in agricultural production.

Finally, with regard to water, the team considers the benefits from this project component to be considerably under-estimated in the economic analysis. This is due in large part to the non-quantifiable nature of some of these benefits. The team feels that the project-funded wells provided for household uses should, if properly maintained, result in a significant health benefit over the long term. Improved access to adequate supplies of "safe" water and consequential improvements in sanitation should contribute significantly to the reduction of gastro intestinal and related diseases which represent a major cause of death of infants and children in developing countries and, in combination with improved food supply, result in improved nutrition levels. Additional benefits from time-savings from water-fetching activities which could be used for other productive activities might also be anticipated.

In terms of returns to the economy, a variety of additional benefits are likely to accrue as a direct or indirect result of this project, including: increased intensity of economic activity and rates of economic expansion, increased social integration of settlement communities (which would enhance security in border areas), possible development of economies of scale with regard to agro-processing and shipping, and maintained or improved environmental conditions (i.e., decreased rates of deforestation and soil erosion).

In consideration of these points, the evaluation team considers that any assessment of returns to investment in the case of this project must be broader in scope than the factors considered in project economic analysis. Several of these "non-quantifiable" factors or "externalities" may, in the opinion of the team, turn out in the long-term to be as significant factors in the development of the project land settlements as those factors considered in the project economic analysis.

Conclusions:

(1) The team projects, based only upon the factors considered in the project economic analysis, that the IRR the B/C ratios anticipated at the outset of the project will likely not be realized during the 15 year planning period adopted, even after allowance is made for the delay in project implementation. This is based largely upon the observation that settlement farmers do not appear to be committing 100 percent of their cultivatable land to the new technologies as had been anticipated, but rather do so on a selective basis (i.e., for specific crops or portions of their land). As a result, the growth in farm production is expected by the team to fall short of that anticipated in the project's economic analysis. This, in turn will reduce the magnitude of benefits deriving from the project-funded roads. The team also projects somewhat reduced benefits from project investments in water resource development due to possible design/site selection inefficiencies in a number of instances.

(2) Considering only the factors included in the project economic analysis and (in retrospect) faulty assumptions notwithstanding, the team anticipates that the IRR in the 15 year planning horizon used in the project economic analysis would likely not exceed 5 percent, while the B/C ratio during this period would likely not exceed 1.00. The team notes, however, that project benefits will likely continue to accrue after this 15 year period. In addition, it is anticipated that the technological changes and roads introduced by this project will form a "foundation" for future technological changes and economic expansion in the project land settlements. Further, the team anticipates that other (some "non-quantifiable") benefits not considered in the economic analysis of both a short- and long-term nature will accrue to project beneficiaries and the economy. Among these are improved communications and social integration in the land settlement communities, more favorable marketing conditions, and improved health and nutrition as a result of improved access to more adequate water and food supplies. When these factors are taken into account, the team anticipates that the long-term return on the investment in this project will be quite acceptable.

C. Research Application Linkages

The third item in the scope of work outlined by USAID was as follows:

A major element of the project was to improve the linkages between agricultural research and extension programs in order to provide farmers with the most appropriate technology available. The evaluation team is expected to examine available evidence to determine whether the project has had any influence on improving linkages between RTG agricultural research and the application of new knowledge at the farm level. The team should examine both informal and formal contacts which may have led to increased understanding between extension, research agencies and the farmers.

The team saw in this element of the scope of work one explicit question and two implied questions. The questions were as follows:

1. Did the project have any influence on improving linkages between RTG agricultural research and the application of new knowledge at the farm level?
2. Were research topics suitable?
3. Were research results adopted?

Each of these questions is addressed in turn.

1. Did the project have any influence on improving linkages between RTG agricultural research and the application of new knowledge at the farm level?

In the initial phase of the program, there was close coordination among representatives from the Department of Public Welfare (DPW), program advisors and researchers from other Royal Thai Government agencies to discuss and plan for agricultural extension activities designed to:

- (a) Improve farm planning through appropriate crop diversification and cropping patterns,
- (b) Improve and maintain soil productivity, and
- (c) Increase year-round cultivation of land.

An attempt was also made to understand the needs and desires of farmers in project areas prior to planning the extension program. In addition to staff from DPW, there were three main government agencies which participated in this cooperative planning: the Department of Agriculture (DOA) advised on crop and soil improvement aspects, the Department of Land Development (DLD) assisted on soil and water conservation and Khon Khaen University (KKU) gave advice on improving backyard poultry production. The extension activities initiated by the project during the implementation phase (1982-1984) are presented in Annex G.

There appeared to be good linkage and cooperation among researchers, DPW representatives and program advisors during the planning period of the program. The linkages and cooperation during the implementation of extension activities were, however, less than adequate. The lack of coordination between researchers and agricultural extension personnel during project implementation resulted in problems in areas such as selection of appropriate sites for the demonstration plots, selection of appropriate planting methods and planting dates, management of field trials and research data recording.

The occurrence and severity of problems mentioned varied among land settlements. These problems were attributed by the evaluation team to several factors, including:

- (a) Some extension personnel were inexperienced and had not yet taken the basic training course provided by the project. In addition, most of extension workers were temporary employees and personnel turnover was high. With each newly hired replacement extension worker, the training process vis-a-vis research and demonstration activities had to begin anew.
- (b) There were delays in delivery of materials to be used in some trials at the land settlements. The delivery of fertilizer, seeds and planting material from the central unit to each land settlement was delayed frequently in the first year of project implementation; however, this problem was reduced in magnitude in the following years.

- (c) Extension workers at some land settlements had a heavy work-load with responsibility for many types of work. This tended to reduce the quality of their contribution to research and field demonstration efforts.
- (d) Follow-up by researchers during project implementation was not adequate.

Irrespective of the existence of some problems, the overall program did make reasonable progress. A strong linkage was found between extension workers and farmers. The extension workers visited villagers quite frequently.

A major shortcoming in the research and field demonstration programs was that research results/analyses were not disseminated by the researchers to the project agricultural extension agents or to farmers.

Conclusions:

- (1) Research and field demonstration activities made a satisfactory progress in most areas.
- (2) There was an attempt by DPW to utilize agricultural research and research personnel in developing demonstration activities for farmers' benefit.
- (3) Coordination among researchers, DPW representatives and program advisors during research planning was generally satisfactory.
- (4) There was considerable lack of coordination between researchers and extension workers during project implementation.
- (5) The delay in delivery of some materials and supplies to the project sites at the beginning of the project reduced the effectiveness and precision of demonstration trials. This problem was resolved later in the project.
- (6) The general lack of experience and training of some extension agents hindered the efforts of researchers.

(7) Extension agents assisted in research data collection. The frequent turnover of temporary hire extension agents reduced their effectiveness in this role.

(8) Research results were not disseminated to extension agents or farmers, seriously reducing the benefits of the research.

Recommendations:

(1) Coordination between researchers and extension workers during project implementation should be given a high priority.

(2) Extension workers should receive more intensive subject matter training.

(3) More complicated research work should be conducted either directly by researchers or under their close supervision. For the most part, extension workers lack sufficient experience to properly execute this level of research.

(4) The non-civil servant extension workers should receive extra financial benefits to reduce the employee turnover rate.

2. Were research topics suitable?

Despite constraints on research and field trial planning activities which were a consequence of a two-year compression of the project implementation period, the types of field trials established by the planning group were generally acceptable. There were, however, some trials which seemed to be inappropriate, e.g., the mungbean after rice and the alley cropping of leucaena with field crop sub-projects. Mungbean after rice in the relatively sandy soil of the Northeast region is unlikely to be successful, due mainly to the low water retention of sandy soil.

For alley cropping of leucaena with field crops which aims at soil productivity improvement, there is a relatively low likelihood of adoption by

farmers due to the time and labor consuming nature of the practice. A better approach for soil improvement which would at the same time earn some cash is crop rotation and cropping systems involving field crops and legumes. As to rice research, rice demonstration plots using only one variety does not seem to be an optimal approach for identifying the best rice variety for the area. Usually at least two or three potential varieties including a local variety should be included in trials if possible.

It is not necessary that all eight land settlements all have the same agricultural extension research activities in common. Land settlements should concentrate on particular sub-projects based upon the nature of the specific problems and the desires of farmers in that land settlement.

Furthermore, more careful consideration of the schedule of the trials is advisable. For instance, an inappropriate planting date could result in severe damage of crops due to disease and/or insects, as was the case when black sesame planting was delayed.

#### Conclusions:

- (1) With a few exceptions, the research topics were generally suitable.
- (2) Research and extension activities in all land settlements were basically identical. They did not reflect the divergent problems and desires of farmers in each of the settlements.
- (3) Some field trial schedules were agriculturally inappropriate.

#### Recommendations:

- (1) Adaptive research and field trial activities should be designed to meet the needs of specific local areas rather than generalized on a regional level.

3. Were research results adopted?

As the research component of the project has just terminated, a detailed analysis of adoption of research results would be premature. To obtain accurate adoption information, a follow-up evaluation should be conducted five years after project termination. Preliminary results showing favorable signs of adoption of research have already been observed, however, in the area of crop production. The biggest success to date in terms of adoption has been used of high yielding rice varieties (RD-6) with about 90% of project area farmers using improved cultivars. Some have even begun using fertilizer with rice.

The results from demonstration plots on soil and water conservation are promising in terms of soil productivity improvement and maintenance. However, the beneficial effect of this technique on crop cultivation is expected to be observed only when this practice is repeated for 3 to 4 years consecutively. For this research to be of significant benefit, project agricultural agents would have to remain in the settlements for at least two to three more years. Otherwise, the projects would likely largely be abandoned by farmers as they would not yet have seen the potential benefits with their own eyes.

Conclusions:

(1) Although it is too soon to obtain detailed adoption rate statistics, preliminary indications are that farmers are accepting new crop production practices which were field tested by the project. Probably the biggest success has been improved rice varieties, with an estimated 90% of farmers growing improved cultivars, e.g., RD 6.

(2) Soil and water conservation demonstration trials have shown promising signs of success. However, full benefits will not become obvious for a few more years.

Recommendations:

(1) Agricultural extension workers should remain in the project area to continue transfer of research and field demonstration results to farmers. Their presence is particularly essential to assure the success of the soil and water conservation components.

D. Project Management

The fourth item in the scope of work is as follows:

Though the project did not have the specific objective of improving management capacities of the Department of Public Welfare, certain strengthening steps were taken to assist project implementation. For example, incorporation of Peace Corp Volunteers, A and E consultant firms and an expatriate project advisor were added to the RTG project management unit. The evaluation team is expected to comment on the overall management of the project, and any transfer of experience which might have occurred from the "external" management resources. What generalized lessons could be learned from the management experience of this project?

The team divided this item into three key questions for analytical purposes.

1. Was the overall management of the project satisfactory?
2. Was there transfer of experience from the "external" management resources?
3. What generalized lessons could be learned from the management experience of this project?

Each of these questions is answered in turn below. The first question to be addressed under this item of the scope of work is:

1. Was the overall management of the project satisfactory?

The overall management of the project was coordinated by the Land Settlements Division, Public Welfare Department, in Bangkok. The Project Coordinator was Chief of the Loans Sub-Division. Under the Project Coordinator in Bangkok were three Assistants to the Project Coordinator who were technically assigned full time to the project. In fact, these project assistants did other tasks as well, but that does not appear to have had a detrimental effect on the project. The four Bangkok-based project staff members evidenced a very high esprit de corps, working well together and really taking a personal interest in the success of the project.

The Bangkok staff of four were in the project settlements frequently, indicating that they took an active role in management of the project. For example, in fiscal year 1984 the four spent a combined total of approximately 35 weeks in the field. This extensive amount of in-field management is felt by the evaluation team to have been a major contributing factor to the success of the project.

The USAID project managers and other USAID staff were equally diligent and effective in their support of the project.

To coordinate and facilitate implementation of the project in the project area, a special position was created, Chief of the Project Regional Office, apparently as a means of decentralizing the project management. The Project Paper called for the Regional Project Officer to outrank the superintendants of the individual land settlements; however, the individual assigned to the position was of equal or lower civil service grade than the superintendants. That situation may have been a factor detracting from the overall effectiveness of the position.

The superintendants of each of the land settlements have many responsibilities in addition to overall responsibility for Land Settlements Project activities in their areas. Hence, in each settlement a subordinate of the Superintendent was designated Project Officer who was responsible for most day to day project activities. However, in practice, some superintendants delegated little authority to their Project Officers, e.g., most requests, reports, etc., had to be signed by the superintendant. This appeared to have slowed implementation of some project activities.

In addition, superintendants were not provided with any discretionary funds specifically for procurement of project inputs. A small (Baht 10,000 to 20,000) discretionary fund would have allowed them to finance special projects which presented themselves outside the normal annual planning/budgeting cycle and/or to cover minor unforeseen costs in planned projects. This would also have encouraged extension agents to look for

high return/low cost mini-projects such as those implemented by the Peace Corps Volunteers and Volunteers in Service Overseas using small amounts of "seed money" made available to them through the Peace Corps. In fact, superintendants on occasion even spent their own money for project activities. This speaks well for the generosity of the superintendants, but is not considered to be an ideal management strategy.

Project settlements were normally assigned three civil service (DPW) agricultural extension workers who were subordinate to superintendants. In addition, the project settlements were provided additional temporary employees to bring the ratio of extension agents to target households up to one to three hundred by the last year of the project. The ratio of civil servants to temporary employees was less than one to three. This system had both strong and weak points.

On the positive side, this high ratio resulted in more frequent and closer contact between villagers and extension agents, (The agent/household ratio specified in Department of Agriculture Extension policy is one agent per 1,000 households.) With such close contact, the opportunity for bottom-up planning was enhanced as well.

On the negative side, the temporary workers had no job security. As a result, in many settlements there was a high rate of extension worker turnover. For example, in Lam Nam Oon a total of nine temporary workers were required to fill two positions over a period of thirty-six months. This rapid turnover was disruptive to project continuity as each new employee had to spend a considerable period of time establishing rapport with the farmers before extension work became truly effective. Efforts on the part of the project management to obtain permanent positions for their temporary workers were largely unsuccessful.

Training of extension agents was adequate in terms of subject areas, although many extension agents expressed a desire for more technical, hands-on training (as opposed to theoretical training). There was

however, a notable gap mentioned by nearly all extension agents: lack of sufficient training in agricultural extension techniques.

In addition to this need for additional training, a high penalty was paid in the area of agricultural extension when the project was compressed. Granted, goals of the project in terms of numbers of farmers trained in new agricultural production methods were met and a ratio of 300 households per one extension agent is probably adequate to help with most of the problems which inevitably occur when farmers plant a new crop or use a new method. However, if, after termination of the project, all the temporary extension workers are no longer to be employed in the project area, available extension services will likely be inadequate for such a large target population, many of whom will be planting new crops or using new production methods for the first time. Department of Agricultural Extension personnel to step in and fill the gap are likely to be not available. Had the project run the full five years, there would have been more farmers who had used the new methods for three, four or five years. These farmers could then have used their more extensive experience to help other farmers using the new production methods for the first time, supplementing the reduced post-project agricultural extension workforce.

Regardless of the ratio of households per extension agent, the agents must be able to communicate well with the farmers for the extension program to be successful. The evaluation team interviewed numerous farmers, with virtually all conversations conducted easily in central Thai (including in Cambodian/Suai speaking Prasat Settlement). However, conversations among villagers were conducted in local dialects. Villagers provided only their final formal answers in central Thai. Although most extension agents spoke the Northeast dialect, the lack of local language ability is likely to have severely handicapped non-dialect speaking agricultural extension agents who would have missed most of the background discussion of the villagers. (As with the non-Cambodian/Suai speaking extension agents in villages where those languages were used).

Motivation of the extension workers is another key factor in success of development projects, and one source of motivation is financial remuneration, i.e., salaries. The pay (monthly salary) of temporary extension workers was frequently late by 3-4 months (up to 7 months), especially for newly hired agents, and at the start of each fiscal year. Having to travel to a new work station in a new town and then to be forced to go without pay for a third of a year or more is not conducive to good employee morale or job performance. Provision should have been made for special advanced pay, e.g., the superintendent's discretionary fund mentioned above, or some other arrangement.

Another element which can directly affect success of a development project is the degree to which farmers are willing and able to work together as a group. Although formation of farmers' groups was mentioned as a key element in the overall project management strategy, in practice this area was given scant attention. Agricultural extension workers received little or no training in how to organize farmers' groups, and there was no immediately obvious evidence that group formation was stressed by project managers. Statistics were not readily available on the types of farmers' groups formed or on the number of group members. However, there was considerable existence of informal groups having been formed in nearly all villages surveyed. The groups most frequently encountered were housewives' groups and young peoples groups, with many weaving groups (for women) as well. Agricultural production groups included fish raisers groups and chicken raisers groups (most were small). Some of the non-agriculture groups had received assistance from other government agencies, e.g., Community Development Officials of the Department of Community Development, Ministry of the Interior.

Formal water users groups were formed to regulate use and maintenance of new water projects, complete with official documents signed by the settlement superintendent, the village headman as water user group head, and other members of the water users group. The evaluation team feels a less formal group would suffice. As water projects are the common property of the village, responsibility for regulations governing their

use and maintenance historically fall to the village headman and the village council. When maintenance is necessary, the headman traditionally calls out the villagers to do the job without any need for official documentation.

Pilot Farmers were utilized as a form of administrative group to help achieve project goals. Management techniques used to select Pilot Farmers (farmers selected to receive special training courses, in agricultural subjects) were satisfactory. The method used for selection in FY 1982 was voting by villagers at village meetings followed by verification of nominees by village headmen or village committees. In FY 1983, the industriousness of farmers participating in a "village development day" (cleanup and fencing day) was the prime criteria. In FY 1984 a combination of the above methods were used. Highly commendable was that extension agents were encouraged by project managers not to select their full quota of Pilot Farmers at once, but rather to add new Pilot Farmers as industrious, motivated individuals were identified. Also a positive aspect, extension agents were allowed to exceed their quota of Pilot Farmers if more suitable individuals presented themselves.

The only negative aspect in the Pilot Farmer program was the stress placed on meeting the Pilot Farmer quota by the end of the reporting period. In some cases this resulted in unsuitable individuals being made Pilot Farmers just to reach the goal of 100% Pilot Farmer participation. This defect was partially mitigated in some cases as some non-Pilot Farmers who particularly desired a training course being offered were allowed to attend in the stead of Pilot Farmers who didn't really want to go.

Pilot Farmers did not form themselves into an active group in the traditional sense, e.g., meeting regularly and working together for the common good of the group. This is not to say at all that the Pilot Farmer program was a failure. Pilot Farmers generally evidenced a degree of self-confidence and a willingness to try new ideas which exceeded that of

non-Pilot Farmers. The Pilot Farmers had seen with their own eyes that (1) change can be beneficial and (2) they can share the benefits of change. Although not a farmers' group in the traditional sense, Pilot Farmers did form a base on which future development can build.

Another function necessary for a successful development project is getting needed supplies to the right location on time. There was an initial problem with delivery of input supplies in the first year as much of the agricultural material was purchased and delivered from Marketing Organization for Farmers warehouses in Bangkok. This resulted in instances of untimely delivery of supplies and of inefficient use of settlement vehicles, e.g., trucks driving empty to Bangkok from a settlement to pick up half a load of agricultural supplies. In the second and third years an effort was made to decentralize procurement to the regional center and the settlement superintendants. This alleviated some of the problems, but some instances of confusion over whether the center or the settlement should be the procuring agent remained.

Conclusions:

(1) The project was capably and wholeheartedly supported at all RTG management levels from the Director General of the Public Welfare Department on down to the project officers and agricultural extension leaders, as it was at all levels of USAID.

(2) DPW project managers spent considerable time in the field, which was in all likelihood a major factor contributing to the degree of success achieved by the project.

(3) Lack of delegation of authority by settlement superintendants to project managers appeared to have slowed some project activities.

(4) The ratio of one agricultural extension agent to three hundred farm families contributed to the success of the project despite the fact that most extension agents had had little or no previous experience.

(5) The high rate of turnover of temporary-hire extension agents (non-civil servants) decreased the potential effectiveness of the agricultural extension program. Efforts of the project managers to obtain permanent positions for these employees were largely unsuccessful.

(6) Lack of local language/dialect capability reduced to some extent the effectiveness of some agricultural extension workers.

(7) Late receipt of pay, especially when first posted, was a hardship for temporary hire extension agents.

(8) Although a number of groups had been formed, formation and strengthening of farmers' groups should have received additional emphasis.

(9) Management of acquisition of inputs/supplies for the project had problems in the first year. Many of these difficulties were later at least partially alleviated.

Recommendations:

(1) Superintendants should delegate more responsibility to project managers.

(2) Superintendants should be provided with a small discretionary fund (10,000 to 20,000 Baht) to finance small special projects or to cover minor costs which were not anticipated in the budget.

(3) Extension agents should receive more practical (as opposed to theoretical) training.

(4) The present staff of agricultural extension agents should be maintained in the project area for another two to three years.

(5) Emphasis on farmers' groups should be increased, particularly agricultural producers' groups.

The second question to be addressed under this item of the scope of work is:

2. "Was there transfer of experience from the 'external' management resources?"

There were two major "external" management resources used by the project: Peace Corps Volunteers/Volunteers in Service Overseas and an expatriot project advisor. Each will be discussed in turn.

A total of 6 PCV's plus 2 VSO's worked with the project. They operated under the supervision and control of the Settlement Superintendants.

Sub-projects initiated by the volunteers (over and above their assigned tasks) nearly all were done almost exclusively using labor and capital donated by villagers, with only small amounts of financial assistance from the Peace Corps or the project budget. (The Peace Corps had a small "seed money" fund available for such efforts.) For example, a total of 78 wells were completed by one volunteer in Prasat over her two year period of service. All inputs for these wells except the drilling equipment were provided by the villagers.

The volunteers also contributed to the project in less easily quantifiable ways. Their youthful energetic spirit, their willingness to take initiative and innovate, and their aggressiveness and diligence all tended to act as role models and as a source of inspiration for both villagers and settlement staff. However, the degree of effectiveness varied considerably from one individual volunteer to another. Overall, volunteers who were generalists were felt by project staff to have been more effective than volunteers with a more specialized background as the volunteers' primary contribution was in broad social rather than technical areas.

The other "external" management resource used by the project was the expatriot technical advisor. As this position was filled by a single

individual, the degree to which this resource benefitted the project depended greatly on the technical knowledge of the individual and his ability to work with his Thai counterparts. The monthly reports and final report of the technical advisor attest to his technical competence. The fact that so many recommendations for project improvement were reported formally in those reports (rather than informally) attest to something less than an optimal relationship with the DPW staff in Bangkok. Probably lack of a mutually understanding and agreement on the role of the technical advisor (in spite of a detailed job description in the advisor's contract) was a contributing factor to that situation.

Conclusions:

- (1) Volunteers (PCVs and VSOs) were a positive component of the project, providing assistance to extension programs more in the area of social development than in technical agricultural matters.
- (2) The technical advisor was competent in the technical aspects of his field. Transfer of experience was probably less than optimal because of a lack of mutual understanding and agreement on the role of the technical advisor: he was seen by DPW managers as strictly a source of advice on technical matters, whereas he viewed himself as a management resource as well.

Recommendations:

- (1) Volunteers (PCV and/or VSO) should be utilized in future development projects. Generalist volunteers are probably most suitable. Although there will inevitably be some degree of friction between the volunteers and the Thai officials, this friction is generally felt to be mutually beneficial.
- (2) Expatriot technical advisors should be employed in future development projects; however, the role of the advisor must be clearly defined and agreed to at start of the project.

The final question to be addressed under this item of the scope of work is:

3. "What generalized lessons could be learned from the management experience of this project.?"

Perhaps the key element in the overall management of the project was the concept of bottom-up planning. Both the spirit and intent of this concept was exhibited throughout most of the project activities. Where bottom up planning was not employed, usually the primary reason was the rush to compress a five year project into three years. However, a few examples of lack of wholehearted commitment to bottom up planning surfaced. For example, in one settlement farmers were described by project managers as being stubborn and lazy because they did not readily accept the development assistance proffered by the project. In fact, the stubbornness or laziness of the farmers was most likely an indication that the specific assistance offered did not meet the needs of the farmers.

Another example of a lapse in bottom-up management philosophy is the case of the central village meeting places or salas. Salas were constructed in 29 villages. A single design and standard size (5 x 7 meters) was used in each case. A standard size/design was used as the project management felt villagers might not be able to develop suitable designs within project financial guidelines if allowed to design the sala by themselves. In fact, it is the project-designed sala which is not suitable. Most villages want two salas: one small sala (about 2 1/2 x 5 meters) to be used as a central newspaper reading room and one large sala (about 10 x 20 meters) for village meetings. (Some villages had already, by themselves, constructed a meeting sala using only village labor and inputs, yet still received the project-designed sala, e.g., Ban Nong Kwang, Lamtakhong settlement. Ban Pla Lo, Lam Nam Oon Settlement, built both a meeting and a reading sala, yet was still constructing a project designed sala--right next to the existing meeting sala.) The project designed sala is too large for the first use, too small for the latter. Villagers apparently agreed to build the project designed salas primarily to avoid offending the well-meaning development personnel who were providing the much-desired land title certificates and other benefits.

In some areas there seemed to be an over-emphasis on quantity as a measure of project success, with insufficient attention paid to quality, e.g., concentrating on the number of Pilot Farmers trained rather than on identifying farmers who could really benefit from the training. This did not seem to be a major problem, however.

As noted many times in this report, the implementation schedule of the project was compressed. Normally, a project is designed as an integral whole, with one activity linked in sequence to other activities. Then, if the project is delayed, there are generally two options: extend the completion date of the project or redesign the project to reduce the scope of work. This project elected neither option, but rather opted for completion, quantitatively, of all original goals. The result was an overall reduction in quality.

Another ramification of the implementation period reduction was the loss of the mid-project evaluation. A mid-project evaluation to measure the degree of success of the project was originally planned, but was later dropped due to the reduced project implementation period. This evaluation would have been a good source of information on how the project was meeting its goals (and how it was meeting the needs of the target population), and would have allowed for any necessary mid-course corrections. In an attempt to overcome the lack of a mid-project evaluation, quarterly monitoring and evaluation meetings were held. These quarterly meetings were limited, at least theoretically, in their effectiveness as they included no outside (non-USAID and non-DPW) evaluators.

One aspect of the project which did not suffer from the shortening of the project implementation period (as it had been completed in 1979) was the Logical Framework. The use of a Logical Framework can be an excellent method of outlining the purpose of a project. The Objectively Verifiable Indicators in the Log Frame can present specific, quantifiable means of measuring the degree to which the project has met its goals. In the Logical Framework of

the Land Settlement Project, many of the items listed in the OVI column are difficult to quantify and are decidedly not objectively verifiable. Some specific examples from the Project Paper:

- (1) A-2, 1. "Rural residents have adequate access to needed goods and services." How much access is adequate?
- (2) A-2, 5. "Poor rural inhabitants generally participating in benefits of economic development." What is generally participating?
- (3) B-2, 1. "Target farmers evidence improved farm planning through appropriate crop diversification and cropping patterns and effectively use available agricultural inputs." What diversification is appropriate? What is effective use of inputs?
- (4) B-2, 3. "Soil fertility maintained or improved." The original soil fertility (pre-project) was never measured.

Conclusions:

- (1) Management practices were generally efficient and effective in most project activities; however, commitment to bottom up planning was inconsistent.
- (2) The basic project plan was developed based on only very general information on the felt needs and actual needs of farmers.
- (3) Emphasis on quantitative success of the project, e.g., number of Pilot Farmers trained, did not benefit project management as much as qualitative information might have.

(4) Many of the Objectively Verifiable Indicators in the project Logical Framework were in fact not objectively verifiable.

Recommendations:

(1) If the implementation period of an agricultural development project must be reduced, the scope of the project should also be reduced. As agricultural development requires changing the thinking and practices of farmers, the process cannot easily be accelerated.

(2) Bottom up management strategies should be employed to the fullest extent possible which is consistent with the abilities of the target population.

(3) Qualitative analysis of project success should be included as well as quantitative measures.

(4) Baseline surveys and other measures of target population felt needs and actual needs should be accomplished before the basic project plan is developed.

(5) Objectively Verifiable Indicators included in the Logical Framework of a project should all be truly objectively verifiable.

E. Replication

The fifth item in the scope of work was as follows:

Are there any indications that this project experience can or will be used by RTG agencies? Will DPW follow the same methodology with other settlements?

The team saw in this item two key questions:

1. Are there any indications that this project methodology can be replicated?
2. Are there any indications that this project methodology will be replicated by DPW with other land settlements or by other RTG agencies?

Both questions are answered in turn below. The first question addressed is:

1. Are there any indications that this project methodology can be replicated?

The team found that virtually all aspects of the methodology of the project could be replicated. The management concept of bottom up planning could be used to some degree in virtually any project. Construction of infrastructure projects (roads and water), the use of architecture and engineering consulting firms to design and supervise infrastructure project implementation, the use of expatriot technical advisors, and the employment of temporary hire agriculture extension agents could be replicated if sufficient funds were available. Use of Peace Corps Volunteers/Volunteers in Service Overseas would require cooperation on the part of United States and British governments, respectively.

Conclusions:

- (1) All aspects of this project methodology are replicable, depending on financial and (in the case of volunteers) political circumstances.

The second question addressed under this item of the scope of work is:

2. Are there any indications that this project methodology will be replicated by DPW with other land settlements or by other RTG agencies?

The following analysis of the intentions of the Land Settlements Division, Public Welfare Department, is based largely on interviews with Land Settlements Division employees. These ideas do not represent an authorized and approved plan of the Land Settlements Division or the Department of Public Welfare, but rather are the interpretation by the evaluation team of comments made by DPW staff.

The Land Settlement Division intends to replicate most aspects of the project methodology in other land settlements in the Northeast with certain modifications and/or caveats. Bottom-up planning would be employed as much as possible. Similar infrastructure projects would be implemented as funding allowed. (Funding to supplement RTG budgets might come from foreign donors, e.g., Canada, Australia or Japan.) Use of architecture and engineering firms, expatriate advisors and volunteers (PCVs and VSOs) would be used only if sufficient DPW staff were not available. The concept of intensive agricultural extension would be continued with the same ratio of one extension worker for each 300 target households as the goal.

As to potential use of this methodology by other government agencies, there was no evidence of any effort to publicize the methodology used in this project to other RTG agencies, even within the Department of Public Welfare. Therefore, any use of this methodology by other agencies could be considered purely coincidental.

Conclusions:

- (1) The overall methodology of the project with some modifications will probably be replicated in other settlement development projects in the Northeast.
- (2) The Land Settlements Division will likely attempt to minimize the use of other than DPW staff in project implementation.
- (3) There is no indication that this project methodology was provided to any other RTG agency; hence, any replications by other agencies would be purely coincidental.

Recommendations:

- (1) Replication of the project methodology with the modifications noted in this report is recommended.
- (2) Involvement of volunteers (PCV's and VSO's) is highly encouraged. Granted, volunteers can mean more work and more headaches for the DPW management staff, but the rewards in terms of vitality and innovativeness are felt to outweigh the costs.
- (3) Use of expatriot technical advisors is recommended with the provision that the role of the advisors be clearly delineated and understood by all parties concerned. Having all technical expertise come from within DPW is likely to result in reduced creativity: even the most dynamic organization periodically needs to be stimulated by outside ideas.
- (4) Descriptions of the methodology of this project and the results of use of that methodology, e.g., this evaluation report, should be translated into Thai and distributed to other RTG agencies to encourage replication of the methodology.

## F. Data Collection

The sixth and final item in the scope of work is as follows:

Under this project extensive data were collected, both baseline and follow-up information. One of the questions which the evaluation team should comment on is the effectiveness of the data gathering system used by this project. Were the data appropriate? Were data analyzed and made available in a useful fashion? What recommendations would the team make to improve data collection procedures for future Mission and RTG projects?

Three specific questions were extracted from this item to be considered by team:

1. Were the data appropriate?
2. Were the data analyzed and made available in a useful fashion?
3. What recommendations would the team make to improve data collection procedures for future Mission and RTG projects?

Each of these questions is addressed separately below, preceded by some general observations on the evaluation plan and methodology used in this project.

In reviewing the various project documents related to evaluation/data collection (i.e., Project Paper, Draft Evaluation Plan, Baseline Surevey Report, specifications and technical documentation prepared by Khon Kaen University and U.S. Bureau of the Census staff), the team notes that the scope of data collection for monitoring and evaluation purposes seems to have diminished somewhat over the course of the project. One example of this is the Management Information System (MIS) that figured prominently in both the Project Paper and the Draft Evaluation Plan as a means of monitoring project implementation and conducting in-house evaluations for USAID Mission project staff, was only partially implemented. The information which was gathered for monitoring purposes was general in nature and provided little basis for assessing qualitative aspects of implementation.

A second example is the marked reduction in the size of the samples for the household survey conducted. The Draft Evaluation Plan (November, 1979) called for a sample size of between 3,000 and 4,000 households for the baseline survey (and presumably for subsequent survey rounds, although this is not clear). As implemented, the sample size for the baseline survey was 1,500 households. The sample size for the followup survey was even lower, 900 households.

The team also notes that in addition to the reduction in sample size, the scope of the followup survey was further reduced by (1) eliminating from the survey universe two land settlements which were included in the original research design and in the baseline survey as a "control" population and (2) eliminating a significant number of potentially useful project effect/impact indicators from the survey protocols.

While it acknowledges the quite ambitious nature of the Draft Evaluation Plan and limitations of funding typically available for undertaking evaluation/research, the team questions the modifications made to the evaluation plan in this project, in particular the reduction in the scope of the evaluation followup survey. The team considers that in view of the large USAID and RTG investment in the project, the apparent importance attached to understanding farming and economic conditions of settlement farmers, and the relatively low marginal cost of following through on the evaluation effort begun in the baseline survey (in which USAID had already made a substantial investment), this was somewhat short-sighted. The reductions that were made limit the strength of the conclusions that can be reached from the survey data regarding project effects and impacts, as well as the depth of insights into the living conditions of farmers in the Northeast that derive from the survey data. While the data collected are for the most part appropriate for the purposes of this evaluation (albeit somewhat more narrowly defined than had been originally intended), the team feels that an excellent opportunity to provide fairly detailed insights into the dynamics of life in and the economies of the project land settlements has been lost.

The team commends the USAID, however, for instituting a study design with pre- and post- project implementation measurements of key effect and impact indicators. The evaluation team feels that having had baseline data available against which to compare both the followup data and field observations contributed significantly to the teams' (and likely USAID's and the RTG's) understanding of farming conditions and practices in the project land settlements

The team's observations on the specific questions in this scope of work are as follows:

1. Were the data appropriate?

The team addressed the issue of "appropriateness" of the data (assumed to refer to the survey data collected by Khon Kaen University since the terms "baseline" and "followup" are specified in the scope of work) from several perspectives: (1) with regard to content and depth of information, (2) in terms of reliability in the statistical sense of measuring changes in key indicators between the survey rounds with a sufficient degree of precision, and (3) in terms of utility for attributing observed changes to the project intervention.

As concerns the first of these aspects, the team finds that the content and depth of the information collected was generally suitable. Additional and more detailed data would, however, have been useful in several areas. For example, more detailed information on the types of agricultural inputs being used by settlement farmers (e.g., seed, fertilizer and pesticide, labor, etc.) would have been useful both in assessing the extent of technological change taking place, as well as for the purpose of isolating project-resultant changes (where the data on the whole are a little weak). Similarly, the team feels that the inability to measure changes in net farm household income detracted somewhat from usefulness of the data. The team recognizes, however, that full-scale income/expenditure and agriculture production surveys would

likely have been necessary in order to obtain sufficiently detailed information. Overall, the team finds that the data collected represent a reasonable compromise between these two lines of inquiry.

Second, with regard to appropriateness of the data collection system from a statistical precision point of view, the team judges that the data collected are, on the whole, adequate. However, and largely as a result of the reduction of sample size in the following survey, the sampling variability of followup survey estimates (in terms of the coefficient of variation-C.V) of several key effect and impact indicators was considerably higher than the corresponding baseline survey estimates. The KKU researchers report several instances in which potentially insightful observations were made equivocal by high sampling variance. Overall, however, the data are sufficiently reliable for assessing changes in key indicators.

The team commends the KKU researchers for calculating measures of reliability for their survey data. It is frequently the case that strong conclusions are drawn from sample survey results without giving any indication as to the extent to which sampling variability may affect the conclusions. The team also commends USAID for supporting this aspect of the survey work despite the fact that it resulted in a considerable delay in completing processing of the baseline survey data (due in large part to the relative inexperience of the data collection/data processing contractors in this aspect of survey undertakings).

Finally, with regard to adequacy of the data from the point of view of attributing observed changes to the project intervention, the team views this as perhaps the weakest aspect of the KKU research. One reason for this is that there is not an appropriate "control" population against which to compare the observed changes for the "project" population. The "experimental" groups ultimately utilized by the KKU researchers differ in terms the "intensity" with which they received project benefits. It is unclear, however, how much more intense project administration was in the project group than in the

control group. As a result, it is difficult to judge how much of the differential changes observed for these groups should be attributed to more intense administration of project benefits in the project group and how much may perhaps be attributable to a lower degree of responsiveness in the control group. The failure to include in the research design a population which received no project benefits further complicates the analyses, since no basis is provided for assessing changes which might have taken place in the absence of the project intervention.

From a methodological point of view, this project is one in which an experimental (or quasi-experimental) design perhaps should not have been attempted. The reasons for this are twofold. First, because of the number of ongoing development activities in the land settlements in the Northeast (by USAID, other foreign donors, and the RTG), it is unlikely that a true "control" settlement (i.e., one with no ongoing development project interventions) was available during the project period. As a result, the utility of a quasi-experimental research design for measuring the magnitude of changes due to the project intervention was somewhat limited from the outset. Second, because project benefits were not "targeted" within the project land settlements but rather were provided to some extent to most (if not all) villages within the project settlements, there was no clear basis for defining (for analytical purposes) a control group within the project land settlements which would support unequivocal findings.

In short, while the team commends USAID and KKU for attempting a quasi-experimental design study (which under the right conditions is a quite powerful analytical tool), the team feels that because of the factors outlined above the use of this type of study design in the present project evaluation resulted in at best a marginal contribution to the measurement of changes which are attributable to the project intervention. Perhaps a more useful approach in this project would have been to identify the factors underlying changes in farming practices undertaken during the project period by settlement farmers on the basis of direct questioning in the followup survey.

A related point concerns the research objective of measuring effects and impacts in all eight project settlements. In our visits to the project settlements, the evaluation team was struck by the diversity among the settlements in terms of a variety of relevant characteristics and conditions. While this cannot be confirmed empirically, it would not surprise the team to find that the project was considerably more effective and successful in some settlements than in others. While the average project effect/impact for all eight settlements as measured in the KKV research is admittedly useful information, the team wonders if more useful information for future project design/implementation purposes might not have been forthcoming from measurements of project effects/impacts for each of the settlement so that analyses of the factor responsible for differential project success of the project in some settlements vis-a-vis others could be undertaken.

#### Conclusions:

(1) Overall, the survey data collected for the evaluation of this project were appropriate and of good quality. The team notes, however, that due to a reduction in the scope of data collection for the followup survey, an opportunity to acquire deeper insights into living conditions and the economies of the project land settlements has been missed.

(2) Due to the lack of a suitable "control" population and the fact that the project was not "targeted" within the project land settlements, the quasi-experimental research design used in this study was not particularly effective.

#### Recommendations:

(1) In project evaluations measuring project effects and impacts, the collection of "before and after" project implementation data is encouraged. It should be recognized in advance, however, that this will typically require a somewhat larger commitment of resources and over a longer period of time than would a "one-shot" post project implementation evaluation effort.

(2) Especially in surveys with small sample sizes, measures of reliability should be calculated from the survey data as a standard operation in the analysis of the data. In the survey research undertaken for this research, the researchers avoided drawing perhaps erroneous conclusions because of having had available measures of reliability for their survey data.

(3) Quasi-experimental design studies should not be attempted without careful appraisal of the nature of the project and the population(s) in which the study is to be carried out. This research design is not especially useful unless there is a clearly defined control population which will be subjected to at most minor "extraordinary" stimuli during the study period and when the project intervention is to be relatively highly targeted. At minimum, the intensity of "exposure" to the project intervention under evaluation and other extraneous influences for the "experimental groups" must be well documented in order for the findings of this type of study to be meaningful.

(4) In designing evaluation studies, the degree of initial differences among sub-groups in the population under study should be assessed carefully to determine whether useful information can be obtained by monitoring the sub-groups separately. In this project evaluation, it is likely that valuable insights could have been gained through the examination of differential success rates for the eight project land settlements and the factors responsible for the differential rates of success.

2. Were the data analyzed and made available in a useful fashion?

The team is unable to comment fully upon this question since the final report had not yet been released by the KKU researchers. However, since one of the evaluation team members (Dr. Magnani) worked with the KKU team in preparing the analyses and the full evaluation team has been provided two debriefings and copies of the preliminary analytical tables for the final report, some reasonably well-informed observations may be made.

From all indications, the analyses prepared will be professionally done and presented in a useful manner. The tabulations reviewed by the team present the baseline and followup survey measurements of each indicator for each of the comparison groups studied in a format which facilitates comparison. Tabulations are available for every item in the followup survey questionnaire.

The one weakness that team finds is there was no provision made for preparing additional tabulations and analyses after the set of tabulations originally specified had been completed. In the experience of the evaluation team members, it is rarely (if ever) the case that all desirable tabulations for analytical purposes are anticipated prior to examining the findings. The evaluation team made several informational requests to the KKU researchers, who responded that they had collected the required data but had not tabulated them in the appropriate format to address the issue in question and, due to time and resource constraints, were unable to accommodate the team.

It would have been highly desirable and beneficial to the overall outcome of this project evaluation had the KKU researchers been able to pursue more detailed lines of analysis in preparing their report. The team notes that the KKU researchers were somewhat rushed in their work, having performed the analyses and prepared their report in a span of less than three weeks. It also would have been beneficial for the evaluation team to have had the opportunity to review the final report and data at the outset of work on the final evaluation exercise.

In light of the above, it might be useful to make the data collected for this project evaluation available to interested RTG agencies and other researchers for further analyses.

Conclusions:

(1) Overall, the team finds that the analyses undertaken by the KKU research team were well done and will prove to be useful to interested parties. The benefits of having collected the data would have been enhanced, however, by having had more time and resources available for more thorough analysis.

Recommendations:

(1) If empirical data are to be used by project evaluation teams, the data should be available in a suitable form at an early stage of their work.

(2) Sufficient time and resources should be devoted to the analysis of data. If this is not provided for, the utility of undertaking the data collection activities is diminished.

(3) The data collected and supporting documentation prepared for this project should be made available to RTG agencies and other researchers for further analysis. To facilitate this, the final report of the KKU research team should be translated into Thai and should contain some indication that further use of these data is encouraged. The KKU research report should be as widely distributed as is feasible to promote this.

3. What recommendations would the team make to improve data collection procedures for future Mission and RTG projects?

The teams' observations on this question center upon two topics: (1) when data should be collected and (2) coordination of data collection activities comprising project evaluation plans.

With regard to the first of these issues, the team suggests that a more useful product might result from future data collection efforts if somewhat greater emphasis were to be placed upon the collection of data for monitoring/evaluation purposes earlier in the project implementation process and with

somewhat greater emphasis on effectiveness and/or qualitative aspects of implementation. Earlier data collection (pre-implementation measurements of project effect/impact indicators notwithstanding) is stressed for two reasons: (1) to provide a basis for identifying faulty assumptions at the project design stage and inefficient implementation procedures and (2) to provide sufficient time for mid-course adjustments to be made. The emphasis on effectiveness and or qualitative aspects of project implementation is based on the obvious point that achieving quantitative implementation targets alone does not guarantee success.

One good example of the need for early data collection is the planning of the overall project. The Project Paper itself was prepared in July, 1979. Then in December, 1981 a workshop was held, attended by the settlement superintendents and the project advisors, to develop project implementation details. In both cases, the planning activities were conducted without benefit of sufficiently detailed sociological/agronomic/economic surveys of specific felt needs and actual needs of settlement farmers. In both cases, it is apparent that (probably due in part to time constraints) the settlements were regarded as virtually identical, hence, the forthcoming implementation plan was the same for each settlement. A baseline survey, or at the very least an abbreviated felt/actual needs survey, should have been accomplished prior to detailed project implementation planning. In fact, the Baseline Survey Report was not completed until September, 1982, too late even to be used in preparation of the final year's project activities plan.

The evaluation team has also observed several examples in this project of instances which could have been corrected relatively easily and to the overall benefit of the project had there been more of an emphasis on these aspects. To cite one example, the team observes that the settlers in the different project settlements displayed widely varying degrees of receptivity to the ideas and activities promoted by the project, and yet there was no provision made for project management to reallocate resources to compensate for/take advantage of this. Another example is the apparently widely varying workloads of extension agents in the different project settlements (which to some extent

may also reflect differential receptivity of the target population). In both instances, mid-course adjustments could have been fairly easily implemented had the necessary information been available to the project managers.

While the team recognizes that delay in project implementation may have contributed significantly to the informational problems encountered in this project, the team recommends that the USAID and the RTG consider earlier and more "effectiveness-oriented" evaluation/monitoring procedures in future projects. While end of project evaluations will still be needed to assess overall project effects and impacts, intensified efforts to assess effective and less-than-effective project elements and implementation procedures will likely lead to more positive project outcomes.

In connection with this point, the team notes that in order for mid-course evaluations to be an effective management tool, key decision-makers in the project implementation agencies must be made aware of the findings (and perhaps be able to confirm them for his/herself). If the evaluation findings do not reach those authorized to make adjustments, these evaluations will represent little more than a formality. Hence, the team recommends provision be made in future project data collection activities to ensure that evaluation/monitoring results reach key decision makers in a timely fashion so that observed problems/shortcomings can be reconciled while the project is still active.

The team also suggests that future data collection activities might benefit from closer coordination of data collection activities intended on the one hand primarily for "monitoring" purposes and on the other hand primarily for "evaluation" purposes. The former activities are usually conducted periodically during the course of project implementation and provide the primary means for assessing whether implementation is proceeding on schedule. The latter are typically larger-scale undertakings and provide measurements of project effects and impacts.

We have suggested above that data collection activities typically viewed as "monitoring" activities might be more informative if greater emphasis were given to measuring "effectiveness" in addition to documenting implementation. Conversely, greater advantage for project management purposes could also be made of the data collection activities designed primarily to provide a basis for measuring project effects and impacts. In this project, for example, the baseline survey could fairly easily have been augmented to provide project management with detailed information on the nature and magnitude of differences in terms of relevant characteristics among the eight project land settlements. This information might have been used to "target" project activities on different settlements and as a basis for allocation of project resources. Similarly, had the survey research undertaken for this evaluation been designed to measure project effects and impacts for each settlement, considerable insight into the factors underlying relative successful and unsuccessful project experiences would have been available to DPW management (in addition to providing measurements of effects and impacts for the project land settlements as a whole).

In short, while the objectives and designs of "monitoring" and "evaluation" data collection systems are rarely fully compatible, it is often the case that fuller advantage can be taken of each of these types of activities in terms of the other to enhance the "lessons learned" from the collection of data. An added advantage of improved coordination of these activities might be that the entire monitoring/evaluation process might become less threatening and confrontational to the implementing agencies, thus further enhancing the value of evaluation exercises.

Recommendations:

(1) Project monitoring/evaluation data collection activities should begin early in the project implementation period and (despite the recency of implementation) should emphasize assessing the effectiveness of project components. This will facilitate making required mid-course adjustments which might enhance the overall impact of the project.

(2) In conducting mid-project evaluations, a line of communication should be established to key decision makers in the implementing agencies to facilitate action being taken in response to evaluation findings.

(3) While data collection systems for "monitoring" and "evaluation" are rarely fully compatible, increased coordination of the informational requirements of the two types of systems will likely result in improved information for both project management and effect/impact evaluation purposes.

## PART III. ANNEXES

### Annex A. ACKNOWLEDGEMENTS

The evaluation team would like to thank Mr. Pramool Chantrachamnong, Director General of the Department of Public Welfare, his staff and members of the many other Thai agencies who assisted the efforts of the evaluation team. Our particular thanks go to Mr. Prachuab Namtip, Ms. Rarinthip Thaweethong, Mr. Thaworn Vichachan, Mr. Anuwat Ananpaporn of DPW, Ms. Rewadee Thanothanuwat of NESDB, and Mr. Chaiwat Wiseswilayawet and Mr. Suchada Thaibunthao of DTEC who accompanied and assisted the team on field trips. We would also like to thank Mr. Supachai Suetrong, Dr. Tawatchai Sitchawat, and Mr. Michael J. Zwack for giving so freely of their own time to assist the evaluation team. We would also like to thank the staff of USAID for their unstinting cooperation in the project, particularly Ms. Thongkorn Hiranraks, the Project Manager. Finally, we would like to express our gratitude to the secretaries and typists who labored long hours and many weekends to assure on time completion of the project: Ms. Salilak Kosinanondh, Ms. Rarintip Smittipong and Ms. Vipasie Smittipong.

Annex B. EVALUATION TEAM MEMBERS AND SCOPE OF WORK

B.1 Evaluation Team Members

(a) Dr. Lamar Robert                      Team Leader

(b) Dr. Supot Faungfupong              Team Member

(c) Dr. Robert Magnani                  Team Member

B.2 Land Settlements Project Evaluation Scope of Work (May 1, 1984)

I. The following scope of work is submitted for the evaluation of subject project.

A. The Project Background

The Project had the primary purpose of improving land utilization and agricultural productivity, and thus income and living conditions, in rainfed agricultural areas comprising land settlements in Northeast Thailand. The project was limited to eight such settlements, but could be replicated in other settlements should the underlying "bottom up" development approach prove successful. The following land settlements were included in the project:

1. Huai Luang Settlement, Udon Thani
2. Non-Sang Settlement, Udon Thani
3. Ubolrat Settlement, Khon Kaen
4. Lam Pao Settlement, Kalasin
5. Lam Nam Oon Settlement, Sakon Nakorn

6. Lam Takhong Settlement, Nakhon Ratchasima
7. Prasart Settlement, Surin, and
8. Kham Soi Settlement, Nakhon Phanom

The project sought to address priority development constraints existing within the eight settlement areas. The project concentrated on helping small farmers improve land use as an effective approach for improving incomes and the quality of life among the rural poor. Specifically, the project objectives included:

- (1) Improvement of farm planning through appropriate crop diversification and cropping patterns.
- (2) Improvement and maintenance of soil fertility.
- (3) Adoption of year-round cultivation of land.
- (4) Provision to rural residents of adequate access to needed goods and services.
- (5) Development of a replicable development and evaluation program.

In order to achieve these results, the following project outputs were to be developed or improved:

- (1) Development of organized farmers groups.
- (2) Improvement of primary and feeder roads.
- (3) Development of water resources.

(4) Increase in the number and training of agricultural extension agents and development of extension - research linkages.

(5) Development of agricultural demonstration plots.

(6) Improvement in the access to and use of agricultural credit.

The project sought to achieve the following specific outputs: a minimum of 300 farmer groups organized and functioning, about 200 kms. of rural road constructed, about 250 water resource development sub-projects completed, one agricultural demonstration sub-project implemented in cooperation with each farmer group and research linkages established with extension efforts.

## II. Purpose of the Evaluation

The main purpose of this evaluation is to document the end of project experience, providing a record of what the project contributed to Thai development. The focus should be on documenting project experiences and lessons learned, thereby providing information to RTG agencies engaging in these types of rural settlement activities. Since this is an end of project evaluation, the team is not expected to make any specific recommendations related to future project changes, but should make general observations on "lessons learned". Since information from the evaluation will be used for the required annual data collection reports, required by Congress, considerable emphasis should be placed on documenting the project's impact.

### III. Major Questions Evaluation Will Answer

A. Beneficiary Participation: One of the main hypotheses of this project was that maximizing beneficiary participation in the selection and implementation of sub-project activities would result in better management and utilization of scarce local resources and provision of an organizational base for continued "bottom up" development activities. Is there any evidence to support this hypothesis?

B. Inputs Equal Self Sufficiency: Another project-hypothesis, broader than "A" above, was that the provision of basic infrastructure (i.e. roads, water supply) in combination with appropriate agriculture technology, farmer organizations (mentioned in para B. above) and land allocation were sufficient pre-conditions for people to (i) at least obtain self-sufficiency and (ii) possibly raise their standard of living. The project's B/C and IRR analysis concluded that the project had acceptable investment returns. The evaluation team should review the economic analysis and sensitivity analysis and comment on whether the investment had reasonable returns to the (a) economy, (b) beneficiaries. It should be noted that since most of the project construction work was completed near the end of the project, there has been insufficient time for the infrastructure element to have had any significant impact on the villager's living conditions. The team may have to use proxy indicators of other methods to estimate future impact of the construction activities. The evaluation team should use available data, interviews, etc. to find evidence to support or question this hypothesis.

The team should also note that though the project data collection activities were not designed to show the relative contribution of each project component, i.e., roads, water resources, agricultural extension training, etc., it would be useful if the team can find evidence of relative importance of one component versus the other project interventions. Such information could be used by the RTG in making management decisions concerning in the relative returns on investments related to various rural interventions options.

C. Research - Application Linkages: A major element of the project was to improve the linkages between agricultural research and extension programs in order to provide farmers with the most appropriate technology available. The evaluation team is expected to examine available evidence to determine whether the project has had any influence on improving linkages between RTG agricultural research and the application of new knowledge at the farm level. The team should examine both informal and formal contacts which may have led to increased understanding between extension, research agencies and the farmers.

D. Project Management: Though the project did not have the specific objective of improving management capacities of the Department of Public Welfare, certain strengthening steps were taken to assist project implementation. For example, incorporation of Peace Corp Volunteers, A and E consultant firms and an expatriate project advisor were added to the RTG project management unit. The evaluation team is expected to comment on the overall management of the project, and any transfer of experience which might have occurred from the "external" management resources. What generalized lessons could be learned from the management experience of this project?

E. Replication: Are there any indications that this project experience can or will be used by RTG agencies? Will RPW follow the same methodology with other settlements?

F. Data Collection: Under this project extensive data were collected, both baseline and follow-up information. One of the questions which the evaluation team should comment on is the effectiveness of the data gathering system used by this project. Were the data appropriate? Were data analyzed and made available in a useful fashion? What recommendations would the team make to improve data collection procedures for future Mission and RTG projects?

#### IV. Evaluation Methodology

As pointed out in Section III, considerable data has been collected. The evaluation team is expected to review this data and the subsequent analyses and to use them as evidence in support of the evaluation report's conclusions. The previous allocated villages (allocated villages indicates those villages which are recognized as resettled and received land certificates) and unallocated villages in the baseline survey are treated as double control groups in the follow-up survey. In addition to using the collected data, the team is expected to utilize field interviews. The Mission will arrange for interviews with Peace Corps personnel, DPW officials, contract staff of KKU, BAAC and other credit institutions, etc. The evaluation team is expected to answer the major questions, listed in Section III, in the priority order of listing. The team should review the following documents:

- (a) Project paper and annexes
- (b) Baseline Survey Report
- (c) Follow-up Survey Data
- (d) Project Files
- (e) Project Audit Report

If, during the course of the evaluation, additional questions/issues arise which the team believes are relevant, the team is encouraged to express these concerns to the Mission and reach agreement on integrating the additions into the evaluation study.

To the extent possible, answers to questions in Section III are to be based upon analysis of empirical data which are provided by the follow-up household survey conducted by Khon Kaen University with technical support by the U.S. Bureau of Census. The evaluation report should specifically identify the data sources upon which analyses of each question are based.

The Contract Evaluation team should include:

1. Team Leader, who should be an American, having Agricultural Economics background and experience in rural development projects. He/she will be responsible for the economic analysis (IRR and B/C ratio) and for supervising and coordinating the work of the team members and preparing the final report. He/she will lead the team members in presentation of the draft report to the RTG implementing agencies and USAID.
2. Sociologist/Mathematic Statistician as a team member. Representative of the U.S. Bureau of Census who has been providing technical assistance to Khon Kaen University and Chulalongkorn University during the follow-up household survey is recommended. He/she will responsible for providing technical assistance and overall guidance to the staff of KKII (the Data Collection and Analysis Contractor) in the analysis of the follow-up survey data and assist the KKU staff in preparing a report describing the results of the analysis. As a member of the evaluation team, he/she is expected to contribute to the team based on his project experience as related to the social and economic impact of the project. He/she will analyze the changes of the project farmers' behavior, rate of adoption of the new farming practices and other changes which related to the implementation plan of the project.
3. Agriculturist American and Thai as team members. These team members should have experience working in agricultural extension programs, including cropping techniques and land use patterns, etc. They should be able to assess the training program provided to project farmers and project staff.

An RTG Evaluation Committee will be appointed to review the results of the evaluation and bring the final report to the attention of appropriate RTG planners. Certain RTG officials may accompany the team as observers or resource persons during field visits.

The time requirement for the evaluation team will be 5 weeks, 6 working days per week. At least two weeks will be spent in the field.

V. Reporting

During the last week of the review, the team will submit to USAID/Thailand a written draft report for Mission review and comments, not less than three days prior to a scheduled review meeting. After submission of the draft report, the team shall make an oral presentation of their findings, conclusions and recommendations for the Mission/Deputy Director, and the USAID Project Committee on a mutually agreed upon date. Five copies of the revised report will be forwarded to the Mission within one month after the departure of the team. After final Mission approval of the report, the team will supply thirty copies to the Mission. The submission of the final report must be by December 31, 1984, the PACD of the project. It is the responsibility of the team leader to ensure that the final draft report is completed in a timely and professional manner, according to the reporting format attached herewith.

Annex C. EVALUATION METHODOLOGY

Sources of Data. Information utilized in undertaking this project evaluation effort was derived from four primary sources:

1. Project documents provided by: USAID the Department of Public Welfare, Bangkok; the project office of the Self-Help Land Settlements Division, Department of Public Welfare; the superintendants' office of each of the eight project land settlements; the two project technical advisers and the Department of Agriculture, Bangkok.
2. Data produced from two household surveys conducted by staff of the Department of Agricultural Economics, Khon Kaen University.
3. Field visits to each of the eight project land settlements.
4. Interviews with officials and project staff of the RTG agencies and USAID who participated in the project.

While information from each of these sources was considered in addressing each item in the scope of work, the team relied heavily upon the survey data to address the question of project effects and impacts, while the other sources provided the bulk of the information used in arriving at conclusions on the other issues in the scope of work.

Further details on each source of information and (where relevant) the strategy used by the team in utilizing the information from the source to address issues raised in the scope of work are described below.

1. Project Documents

The following documents were made available to the evaluation team as sources of information for this evaluation:

a. Project Documentation

- (1) Project Paper and Loan Agreement
- (2) Grant Agreement
- (3) PIL - Loan Agreement
- (4) PIL - Grant Agreement
- (5) Approved Financial/Implementation Plan - Fy 83/84
- (6) Approved Financial/Implementation Plan - Fy 84/85
- (7) Proposed Implementation/Financial Plan - Fy 83/84
- (8) Implementation/Financial Plan of Fy 81 & 82, Loan/Grant
- (9) Project Implementation Review (PIR) and Monitoring Plan
- (10) Updated CPs, dated June 4, 1982
- (11) CPs as of February 18, 1980

b. Contracts

- (1) Michael J. Zwack - Contract & Vouchers
- (2) " - Correspondence
- (3) " - Monthly Reports
- (4) " - Time & Attendance Reports and  
Work/Trip Itinerary
- (5) Dr. Thawatchai Sitchawat - Contract & Vouchers
- (6) " - Correspondence & Monthly Reports
- (7) " - Time & Attendance Reports and  
Work/Trip Itinerary
- (8) Contracts with the A&E Firms and the Feasibility Study and  
Progress Reports - 1982
- (9) A&E Firms' Amount & Estimated Cost for Road & Water Resource  
Construction
- (10) Invitations for Bids on the Design of Road & Water Resource  
Construction w/Maps
- (11) Contracts of Road and Water Resource Construction at  
Ubolrat - Session 1

- (12) USAID Required Documents for the Construction at Ubolrat -  
Session 1
- (13) Implementation Schedule at Ubolrat, Fy 82
- (14) Approved Cost Estimate for the Construction for Fy 83/84  
(Road)
- (15) Approved Cost Estimate for the Construction for Fy 83/84  
(Water Resource)

c. Other Documents

- (1) Audit Inspection
- (2) DPW Semi-Annual Report
- (3) Agricultural Bulletin
- (4) Advisor's Trip Report (in Thai)
- (5) Draft Evaluation Plan, USAID/ARD, 1979
- (6) Baseline Survey Report, KKU, 1982
- (7) Final Report Tabulations, KKU, 1984
- (8) Report on Soil and Water Conservation Demonstration  
Program Fy 1982 - 1983
- (9) Thai Department of Agriculture Report on Activities  
in the Northeast Land Settlements 1983 (in Thai)
- (10) Summary Report of Project Accomplishments of Each  
Land Settlement
- (11) Miscellaneous Trip Reports and Briefing Materials

2. Survey Data

The data from two rounds of household surveys conducted under the auspices of the Department of Agricultural Economics, Khon Kaen University, provided the primary basis used by the evaluation team to assess project effects and impacts.

### 3. Field Visits

Each of the eight settlements was visited by the evaluation team, with a standardized procedure of interviews and observations being employed. At each settlement, a formal briefing was conducted for the evaluation team by the settlement staff describing project accomplishments. Following that, superintendants were interviewed privately by team members using unstructured interview techniques.

In addition to interviewing superintendants, all the agricultural extension agents at each settlement were interviewed as a group with no DPW supervisors present. The following is a list of the key areas covered in the interviews with extension agents.

- a. Numbers of agricultural extension workers that were Northeast natives.
- b. Number of months that each extension worker had been with the project.
- c. Number of extension workers who had received basic training for extension workers under the project and the nature of that training.
- d. Number of extension workers who had received subject matter training under the project by type of training.
- e. Extension agents' evaluation of sufficiency of training received and their desires regarding additional training.
- f. Timeliness of delivery of agricultural extension sub-project inputs and supplies and reasons for any delays.
- g. Extension agents' assessment of their ability to manage their assigned workload.

- h. Types and characteristics, of farmers' groups which existed prior to project implementation.
- i. Types of farmer groups initiated due to project activities.
- j. Subjects relating to the degree to which bottom up approach was employed in agricultural sub-projects.
- k. Problems encountered by extension agents relevant to research activities.
- l. The degree of support received from extension agents from the settlement superintendant.
- m. Other comments/ideas/problem areas the extension agents wished to discuss.

At each settlement, two villages were selected by the evaluation team for on-site visits. Using information received from the project technical advisors and other sources, the team attempted to select one village in which the project had been particularly successful and one in which the project had been less successful. In the selected villages, the headman and other leading farmers (who may or may not have been Farmer Leaders) were interviewed. The following is a list of the key areas covered in the interviews.

- a. Age of village.
- b. Number of households which had received land certificates and number which had not.
- c. Types of sub-projects within the village and their perceived importance to the villagers including which were most and least beneficial and why.

- d. The nature of and degree of beneficiary participation in the sub-projects.
- e. Perception, of extension workers' contribution to the village and villagers.
- f. Types and characteristics of farmers' groups, both pre existing and those established during program implementation.
- g. Types of people's participation activities accomplished in the village and their perceived value to the village and villagers.
- h. Perceived role of Pilot Farmers and their contribution to agricultural activities of other villagers.
- i. Perceptions regarding involvement of Peace Corp Volunteers/Volunteers in Service Overseas.

In addition to the above, the team also observed infrastructure projects in or near the selected villages. During this activity a random sampling of villagers were interviewed regarding their opinions of the infrastructure projects, e.g., whether the projects were felt to be useful, whether the location of the projects were appropriate, the degree of beneficiary participation in selection and implementation, etc.

#### 4. Interviews

The team attempted to interview all officials and project staff of RTG agencies and USAID which had had a major participatory role in project planning/implementation. As the roles played by the various individuals in the project differed widely, no standard interview format was employed. Among the key agencies contacted were the following. (A complete list of individuals and agencies contacted can be found in Annex D.)

- USAID
- Public Welfare Department,
- Department for Technical and Economic Cooperation
- National Economic and Social Development Board
- Department of Land Development
- Department of Agriculture
- Bank for Agriculture and Agricultural Cooperatives
- Research Development Institute, Khon Kaen University
- United States Peace Corps
- Thai-Netherlands Integrated Development Project
- North East Regional Office of Agricultural and Cooperatives,  
Tha Phra, Khon Kaen.

Annex D. SCHEDULE OF ACTIVITIES AND PERSONS CONTACTED

D.1 Schedule of Activities

Monday, Oct. 1

Morning

On board

Meet with Mr. Foti, O/AGR

Mr. Resseguie, O/AGR

Mr. Ploch, O/PROG

Mr. Neave & Mr. Mintara, O/ENG

Afternoon

Review Project Documents at USAID

Tuesday, Oct. 2

Morning

At USAID

13:00

Meet with Mr. Sumathee, Director of AID Division,  
Department for Technical and Economic Cooperation

14:00

Meet with Mr. Thaveep Thavepanit, Deputy Director  
General of Public Welfare Department

14:30

Meet with Mr. Prawat Rattanachamng, Director of  
Survey & Construction Planning Division

15:00

Meet with Mr. Prachuab Nam-tip (Project Coordinator),  
Mr. Thaworn Vichachang (Asst. Project Coordinator)  
& Ms. Rarintip Thaveethong (Asst. Project  
Coordinator), DPW

Wednesday, Oct. 3

09:00

Meet with Mr. Surat Koonphol, Peace Corps Volunteer  
Supervisor

14:00

Meet with Dr. Thawatchai Sitchawat, Former Land  
Settlements Project Technical Advisor at National  
Research Council

Thursday, Oct. 4

09:00

Meet with Mr. Chote Sithibuth, Department  
of Agriculture

11:00

Meet with Mr. Kriangkrai Lekakul, Department  
of Land Development

14:00

Meet with Mr. Pramool, Director General of PWD

Friday, Oct. 5

10:00

At USAID

Presentation on Project Surveys by Dr. Magnani

13:30

Group discussion

Monday, Oct. 8

07:00

Depart Don Muang Airport for Khon Kaen

08:00

Arrive Khon Kaen Airport

09:00

Meet with Mr. Supachai Suetrong and his team on  
follow-up survey, KKU

11:30

Meet with Dr. Akin, Director of Research Development  
Institute and Dr. Compton on PWD Administration

13:00

Meet with Dr. Kanok and his team of the Improvement  
of Backyard Poultry Production Research Program

14:00

Meet with Dr. Alton, USAID Project Officer of NEARD  
and Mr. Ned Greeley of ASIA/PD at Rosukon Hotel

15:00

Depart Rosukon Hotel for Tha-Phra Regional Agricultural  
Center to meet with the training Co-ordinator and  
Dr. Ragland of NEARD

20:00

Attend Mike Zwack's presentation on the Land  
Settlements Project at Khon kaen Hotel

Tuesday, Oct. 9

08:00

Depart Kosa Hotel, Khon Kaen

08:30

Arrive Ubolrat Dam Resettlement

Visit the Ubolrat Regional Office, meet with  
Mr. Prasong Somkid, Regional Officer

17:00

Depart The Settlement

Wednesday, Oct. 10.

08:00	Depart Kosa Hotel, Khon Kaen
09:30	Arrive Lam Pao Land Settlement
	Work at Lam Pao Land Settlement
16:30	Finish the work at Lam Pao Land Settlement

Then the team split into 2 groups, Team A and Team B.

Team A was composed of:

Evaluation Team:	Dr. Supot Faungfupong
	Dr. Robert Magnani
PWD:	Mr. Prachuab Namtip
USAID:	Mr. Mintara Silawatsharianai
DTEC:	Mr. Chaiwat Wisewilayawet
	Ms. Suchada Thaibunthao

Team B was composed of:

Evaluation Team:	Dr. G. Lamar Robert
PWD:	Ms. Rarithip Thaweethong
	Mr. Anuwat Ananpaporn
	Mr. Thaworn Vichachan
USAID:	Mr. Robert Resseguie
NESDB:	Ms. Revadee Thanothanuwat

Following is the schedule of each Team

Team A

Wednesday, Oct. 10 (Continued)

16:30 Depart Lam Pao Land Settlement  
18:00 Arrive Kosa Hotel, Khon kaen, stay overnight

Thursday, Oct. 11

08:00 Depart Kosa Hotel, Khon Kaen  
10:00 Arrive Non Sang Land Settlement  
16:00 Depart Non Sang Land Settlement  
17:30 Arrive Udorn Province, stay overnight at Chareon Hotel

Friday, Oct. 12

08:00 Depart Chareon Hotel, Udorn Province  
08:45 Arrive Huai Luang Land Settlement  
15:00 Depart Huai Luang Land Settlement  
15:45 Arrive Udorn province  
17:25 Depart Udorn Airport  
19:00 Arrive Don Muang Airport

Team B

Wednesday, Oct. 10 (continued)

16:30 Depart Lam Pao Land Settlement  
17:00 Arrive Kalasin Province  
20:00 Arrive Sakon Nakhon Province, stay overnight

Thursday, Oct. 11

08:00 Depart Sakon Nakhon Province  
10:00 Arrive Kham Soi Land Settlement  
16:30 Depart Kham Soi Land Settlement  
18:00 Arrive Sakon Nakhon Province, stay overnight at  
Imperial Hotel

Friday, Oct. 12

08:00 Depart Sakon Nakhon Province  
09:00 Arrive Lam Nam Oon Land Settlement  
14:00 Depart Lam Nam Oon Land Settlement  
16:00 Arrive Udorn Province  
17:25 Depart Udorn Airport  
19:00 Arrive Don Muang Airport.

Team A and B rejoined

Saturday, Oct. 13

At USAID

Sunday, Oct. 14

Evaluation Team meeting at Kasetsart University

Monday, Oct. 15

08:00 Ms. Thongkorn, Mr. Foti, Mr. Resseguie, Mr. Hopkins  
and Mr. Ploch meet together  
11:30 Meet with Mr. Ploch, Mr. Foti, Mr. Resseguie,  
Mr. Neave, Mr. Mintara and Mr. Hopkins

Tuesday, Oct. 16

08:00 Mr. Ploch, Mr. Foti, Mr. Howley, Mr. Resseguie,  
Mr. Hopkins meet with Mr. Halligan  
10:30 Meet with Mr. Halligan, Mission Director only  
Mr. Fallon meet with Mr. Praderm, BAAC representative  
17:00 Working dinner with Dr. Thawatchai at the Ambassador  
Hotel

Wednesday, Oct. 17

07:00 Depart USAID compound  
10:30 Arrive Lam Takhong Land Settlement  
17:00 Depart Lam Takhong Land Settlement  
19:00 Arrive Korat Province, stay overnight at Sri Pattana  
Hotel

Thursday, Oct. 18

07:30 Depart Sri Pattana Hotel  
10:00 Arrive Prasat Land Settlement  
16:00 Depart Prasat  
21:00 Arrive Khon Kaen, stay overnight at Kosa Hotel

Friday, Oct. 19

08:30 Depart Kosa Hotel  
09:00 Arrive Khon Kaen University, meet with Mr. Supachai.  
12:00 Lunch  
13:30 Meet with PWD and settlement staff  
15:00 Depart Khon Kaen University  
17:45 Arrive Don Muang Airport

Saturday, Oct. 20

17:45 for Dr. Robert  
18:45 Depart Khon Kaen Airport  
Arrive Don Muang Airport

Sunday, Oct. 21

12:00 Dr. Robert, Dr. Supot meet with Mr. Zwack at the  
Asia Hotel

October 22 - 23

At USAID

Wednesday, Oct. 24

11:00 Meet with Mr. Prachuab, Ms. Rarintip, Mr. Thaworn  
from PWD and Ms. Revadee from NESDB

Thursday, Oct. 25

At USAID

Friday, Oct. 26

10:00

Briefing to Mr. Foti, Mr. Ressegufe, Mr. Ploch, Mr. Hopkins, Mr. Neave, Mr. Mintara and Ms. Thongkorn for USAID. RTG Representatives: Ms. Revadee, Ms. Suchada, Mr. Krucphan, Mr. Prachuab and Ms. Rarintip

October 27 - 29

Work on the draft of final report

Monday, Oct. 29

Distribution of the draft report to RTG counterparts (Major Conclusions and Recommendations only)

October 30 - 31

Work on the Annexes

Thursday, Nov. 1

Morning

15:00

At USAID  
Presentation of the draft report to Mr. Pramool, Director General of PWD, Mr. Thaveep, Deputy Director General of PWD and Mr. Thavee, Director of Self-Help Land Settlement Division

November 2 - 4

At USAID

Monday, Nov. 5

Distribution of draft final report to USAID Project Committee and RTG counterparts

Tuesday, Nov. 6

At USAID

Wednesday, Nov. 7

Presentation of the draft final report to Acting Mission Director, USAID Project Committee

**D.2 Land Settlement Superintendants and Villages Contacted**

**(a) Superintendants**

Mr. Tien Aryanant	Ubolrat Land Settlement
Mr. Narong Amornruk	Huai Luang Land Settlement
Mr. Pravit Poolkesorn	Lam Pao Land Settlement
Mr. Suthon Klaijinda	Non Sang Land Settlement
Mr. Sureesuk Silawan	Lam Nam Oon Land Settlement
Mr. Ruay Suka	Prasart Land Settlement
Mr. Prasop Chanasit	Lam Ta Khong Land Settlement
Mr. Kanit Pasathiti	Kham Soi Land Settlement

**(b) Villages**

Huay Seua Ten	Ubolrat Land Settlement
Na See	" " "
Ban Bor	" " "
Kogesoong	" " "
Nonchai	Lam Pao Land Settlement
Kam Plapha	" " "
Thinpattana	" " "
Huay Seua Ten	" " "
Nongnarerng	Non Sang Land Settlement
Ban Thin	" " "
Nongbua-ngern	" " "
Loa-ay	Huai Luang Land Settlement
Nongsrang	" " "
Khamnang-oak	Kham Soi Land Settlement
Noncharoen	" " "

Ban Pha Lo  
Klang

Lam Nam Oon Land Settlement  
" " "

Supresthee  
Nongkwang

Lam Ta Khong Land Settlement  
" " "

Sadoa  
Pungmeng  
Takian

Prasart Land Settlement  
" " "  
" " "

Annex E. SUPPORTING DATA/TABULATIONS

Selected tables extracted from

THE LAND SETTLEMENTS PROJECT IN NORTHEAST THAILAND:

FOLLOWUP SURVEY REPORT

(VOLUME I)

Prepared by

Department of Agricultural Economics

Khon Kaen University

Khon Kaen, Thailand

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International Statistical Program Center

U.S. Bureau of the Census

Washington, D.C.

November 1984

Table 3.4 Percentage of Farm Households Utilizing Land for Selected Purposes

Type of Land Use	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Paddy land	62.2	66.6	80.0	80.2	86.6	75.4
Field crop land	88.5	97.0	73.3	85.1	88.6	82.5
Land for mulberry	8.0	14.6	3.3	15.4	13.2	17.1
Vegetable garden	3.7	11.0	5.0	22.6	17.3	26.7
Orchard	22.7	33.1	12.7	26.9	20.5	31.7
Home area	80.5	91.5	51.7	89.5	83.8	90.1
Forest of wasteland	31.4	38.3	21.5	19.7	25.4	15.3
Other purposes	3.8	3.2	1.8	2.6	3.0	2.4

Source : Baseline Appendix B, Table 25A and Followup Appendix B, Table 18

Table 3.6 Proportion of Land Devoted to Selected and Uses by Farm Households

Type of Land Use	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Paddy land	30.9	32.3	48.9	41.4	47.1	37.1
Field crop land	50.0	48.8	36.3	42.5	41.0	43.6
Land for mulberry	0.7	2.2	Z	0.5	Z	0.5
Vegetable garden	Z	Z	Z	1.4	0.6	1.9
Orchard	2.8	2.9	2.2	5.3	1.4	8.2
Home area	4.4	3.9	2.0	2.8	2.9	2.7
Forest or wasteland	10.4	9.3	9.9	5.8	6.1	5.6
Land for other use	0.7	Z	Z	Z	Z	Z

Z = less than one-half of one percent

Source : Baseline Appendix B, Table 25C and Followup Appendix B, Table 20

Table 3.7 Percent Distribution of Farm Households by Number of Months during which all or Part of Households Farmland was Under Cultivation during the previous 12 months.

Number of Months	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
None	0.4	1.0	1.3	0.8	1.3	0.5
1 month	5.6	0.7	0.4	-	-	-
2 months	0.9	1.7	0.4	0.5	-	0.9
3 months	-	3.1	0.4	5.9	3.2	7.9
4 months	2.8	9.2	1.1	11.5	9.7	13.4
5 months	5.0	8.8	9.0	16.7	13.6	19.1
6 months	8.4	12.8	14.9	12.6	12.2	12.9
7 months	7.5	3.8	20.5	3.1	4.8	1.8
8 months	8.4	0.8	9.7	3.1	2.4	3.6
9 months	17.2	6.5	12.5	4.1	5.0	3.4
10 months	14.0	12.9	12.1	4.1	4.5	3.9
11 months	11.4	10.1	6.3	9.9	10.6	9.4
12 months	17.0	28.6	10.2	26.8	31.7	23.2
Not reported	1.4	-	1.2	0.4	0.8	-
Median	9.4	9.9	8.6	8.5	9.5	7.3

- = No observations in this category

Source : Baseline Appendix B, Table 33 and Followup Appendix B, Table 21

Table 3.8 Percentage of Farm Households Growing Selected Crops during previous 12 months

Type of Crop	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Glutinous rice	52.9	47.2	65.0	68.5	76.1	62.6
Non-glutinous rice	24.4	32.3	38.0	41.3	47.6	36.5
Corn for consumption	5.0	10.4	4.2	23.3	32.7	16.2
Corn for livestock	17.5	19.1	17.2	15.4	12.5	17.7
Kenaf	16.1	28.5	9.3	25.4	29.4	22.4
Jute	3.4	3.3	3.7	1.9	4.5	
Cassava	59.9	57.4	46.5	41.6	57.3	29.6
Mungbean	7.4	6.2	1.1	2.2	5.1	-
Sugar cane	3.6	22.5	3.9	23.2	11.6	32.0
Peanuts	10.8	16.2	4.6	16.1	29.9	5.6
Pineapple	2	10.3	-	5.3	6.1	4.7
Sorghum	2	0.7	2	0.9	1.2	0.
Cotton	14.9	12.4	10.1	7.7	5.2	9.6
Water melon	5.1	6.5	1.2	6.3	10.9	2.7
Pumpkin	2.2	17.9	1.2	12.8	21.0	6.6
Sesame	2.6	0.5	1.6	1.5	2.7	0.5
Chili	12.8	40.8	2.7	18.3	52.2	45.3
Vegetables	5.2	45.1	9.2	68.7	74.3	64.4
Others crops	2.1	2.4	1.4	10.1	12.2	9.6
No of crops grown by at least 10% of households (exclusive 'other crop')	8	14	5	11	12	9

2 = Less than one-half of one percent

- = No observations in this category

Source : Baseline Appendix B, Table 26 and Followup Appendix B, Table 22

Table 3.10 Proportion of land planted in selected crops during the previous 12 months

Type of crop	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Glutinous rice	20	16	36	29	31	26
Non glutinous rice	14	16	17	14	14	14
Corn for consumption	2	2	2	1	1	2
Corn for livestock	29	31	22	23	22	23
Kenaf	3	3	2	2	4	2
Jute	2	-	2	2	1	-
Cassava	21	15	15	11	16	7
Mungbean	3	2	2	2	1	-
Sugar cane	2	8	1	12	3	19
Peanuts	1	1	2	1	2	2
Pineapple	-	2	-	2	2	2
Sorghum	2	2	-	2	2	2
Cotton	5	3	4	1	2	2
Watermelon	1	2	2	2	2	2
Pumpkin	2	2	2	2	1	2
Sesame	2	2	2	2	2	2
Chili	1	2	2	2	1	3
Vegetables	1	1	1	3	2	3
Other crops	2	2	2	2	2	2

- = No observations in this category

2 = Less than one-half of one percent

Source : Baseline Appendix B, Table 56 and Followup Appendix B, Table 24

Table 3.15 Percentage of farm households using chemical fertilizer in previous 12 months by crop type.

Crop Type	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Glutinous rice	51.3	84.5	67.1	85.5	86.8	84.3
Non-glutinous rice	76.0	77.4	62.6	65.1	80.9	89.2
Corn for consumption	30.6	65.0	30.5	46.9	43.7	51.9
Corn for livestock	5.5	24.5	9.0	42.8	67.0	29.8
Kanaf	10.9	21.0	12.4	34.5	45.1	24.0
Jute	25.1	11.1	32.5	23.3	23.3	-
Cassava	1.8	3.1	12.9	13.7	22.8	Z
Mungbean	61.4	64.0	27.8	19.2	19.2	
Sugar cane	85.6	90.2	86.1	89.7	77.6	93.0
Peanuts	35.5	20.6	8.4	36.5	42.1	13.5
Pineapple	-	25.3	-	1.6	3.1	-
Sorghum	-	-	-	-	-	-
Cotton	64.4	64.1	62.6	43.3	24.3	51.2
Watermelon	65.5	15.9	95.8	54.0	58.5	40.4
Pumpkin	86.1	27.4	54.0	22.2	28.3	7.2
Sesame	11.3	-	9.4	17.6	-	84.0
Chili	59.6	69.6	65.1	65.3	69.3	61.8
Vegetables	90.8	67.4	93.7	66.1	67.3	65.0
Other crops	40.4	-	55.7	40.8	44.7	37.0

Z = Less than one-half of one percent

- = No observations for this category

Source : Baseline Appendix B, Table 26 and Followup Appendix B, Table 29

Table 3.16 Percentage of farm households using pesticide in previous 12 months by crop type.

Crop Type	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Glutinous rice	4.7	23.1	21.3	36.0	37.6	34.6
Non-glutinous rice	6.7	18.3	8.5	25.4	31.7	19.3
Corn for consumption	21.1	14.5	34.8	25.1	21.6	30.6
Corn for livestock	3.8	3.2	1.8	9.4	14.4	6.6
Kenaf	1.2	-	2.1	3.2	4.5	2.0
Jute	-	-	-	4.7	4.7	-
Cassava	0.5	-	-	-	-	-
Mungbean	92.1	100.0	83.7	66.0	66.0	-
Sugar cane	14.4	23.1	-	6.5	7.3	6.2
Peanuts	36.4	20.3	9.6	31.7	26.7	52.1
Pineapple	-	-	-	1.7	3.5	-
Sorghum	-	-	-	-	-	-
Cotton	81.8	74.1	96.3	55.9	29.2	66.9
Watermelon	70.2	26.7	100.0	42.7	48.6	24.7
Pumpkin	86.1	8.6	65.3	20.1	24.9	8.6
Sesame	20.3	-	4.7	-	-	-
Chili	59.8	61.2	70.8	67.4	62.3	71.9
Vegetables	85.1	54.7	96.8	68.5	63.2	73.2
Other crops	15.5	-	55.7	25.6	34.9	16.6

z = Means less than one-half of one percent

- = Means no observations for this category

Source : Baseline Appendix B, Table 27 and Followup Appendix B, Table 30

Table 3.19 Percent Distribution of Farm Households by use of irrigation in the previous 12 months

Use of Irrigation	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total	Allocated	Un-
				Project Villages	Villages	allocated Villages
Using Irrigation	7.0	11.3	11.1	27.7	20.0	33.6
Not using irrigation	93.0	88.7	88.9	72.3	80.0	66.

Source : Baseline Appendix B, Table 31 and Followup Appendix B, Table 34

Table 3.22 Percentage of Farm Households using selected agricultural methods during previous 12 months.

Methods	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total	Allocated	Un-
				Project Villages	Villages	allocated Villages
Percentage reporting using:						
Tractor plowing	52.4	52.8	41.6	35.5	30.6	39.2
Crop rotation	14.4	17.4	6.8	15.1	21.4	10.4
Intercropping	11.2	23.3	7.4	20.8	21.0	20.7
Soil testing	2.6	8.2	0.6	2.1	2.3	1.9
Second cropping	18.8	22.2	15.4	15.8	17.3	14.7
Dry season cropping	24.3	61.2	22.4	72.0	80.5	65.5

Source : Baseline Appendix B, Table 30 and Followup Appendix B, Table 33

Table 4.1 Average units of production per rai during previous 12 months by crop type.

Crop Type	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
glutinous rice (kg/rai)	241.5	243.8	249.6	297.7	281.0	314.0
Non glutinous rice(kg/rai)	250.9	239.8	251.3	292.3	284.9	298.2
Corn for Livestock(kg/rai)	272.9	222.4	248.4	257.1	258.6	256.0
Cassava (tons/rai)	1.5	1.5	1.3	1.6	1.7	1.5
Kenaf (kg/rai)	139.7	141.0	202.5	157.2	179.5	129.8
Corn for consumption (ears/rai)	1,324.5	538.2	1,273.1	705.8	767.9	588.5
Sugarcane (tons/rai)	6.0	6.0	6.1	5.4	4.7	5.5
Peanuts (kg/rai)	134.4	204.0	146.7	148.3	145.0	168.7
Pumpkin (kg/rai)	503.1	107.9	280.1	87.5	95.4	56.5
Cotton (kg/rai)	184.0	197.0	105.4	215.6	155.6	230.8
Watermelon (kg/rai)	317.0	137.7	1,018.9	999.8	807.0	2,513.0
Pineapple (kg/rai)	400.0	178.0	-	59.0	76.2	33.6
Mungbean (kg/rai)	69.6	87.4	53.4	73.1	73.1	-
Jute (kg/rai)	162.2	255.3	164.8	297.7	297.7	-
Sesame (kg/rai)	49.2	*	56.7	27.3	24.5	29.2
Sorghum (kg/rai)	85.4	-	100.0	152.6	123.7	200.0

\* = insufficient number of observations

Source : Baseline Appendix B, Table 35 and Followup Appendix B, Table 25

Table 4.2 Percent distribution of farm households by gross household income during the previous 12 months.

Income Range (Baht)	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Village	Allocated Villages	Un-allocated Villages
1 to 5,000	3.5	0.7	4.2	0.6	0.5	0.6
5,001 to 10,000	12.0	9.7	12.7	10.0	5.8	13.4
10,001 to 15,000	17.2	12.9	15.7	9.8	10.8	9.0
15,001 to 25,000	26.2	18.5	25.8	17.2	21.4	13.7
25,001 to 40,000	21.2	24.7	20.8	23.0	26.9	19.8
40,001 to 60,000	8.2	14.8	10.2	15.9	14.4	17.1
60,001 to 80,000	5.2	6.9	3.6	6.9	7.2	7.3
80,001 to 100,000	3.3	3.5	2.7	4.1	3.5	4.7
over 100,000	3.2	6.5	4.2	12.3	9.7	14.4
Mean	30,650	42,668	30,692	48,771	44,710	52,100
Median	22,558	29,880	21,941	33,087	31,413	35,076
Gini coefficient	0.4402	0.4564	0.4383	0.4300	0.3971	0.4693

Source : Baseline Survey Report, Table 3.8 and Followup Survey Tables 15 and 16 (Appendix B)

Table 4.3 Percentage of households reporting income from selected sources

Source of Income	Previously Allocated Villages		Total Project Villages Baselines	Followup Survey		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Crops	97.0	99.0	90.3	90.0	97.4	85.0
Livestock	84.6	83.0	70.6	73.1	85.1	64.8
Poultry products	7.4	3.2	7.0	8.2	10.6	6.5
Handicraft	3.8	1.3	5.2	7.3	9.6	5.8
Sericulture	7.2	12.4	1.2	5.9	6.3	5.7
Raising fish	0.5	2.2	Z	3.9	3.9	3.9
Fishing	6.3	9.9	10.8	14.2	16.2	12.9
Wages & Salaries	69.5	69.6	58.5	59.3	63.6	56.3
Net from trade	9.8	7.5	11.3	10.3	14.0	7.8
Remittance from outside	12.1	12.7	10.2	20.9	15.6	24.5
Rental	3.0	6.7	2.7	3.1	4.2	2.3
Orchards	21.9	33.4	14.6	22.9	28.1	19.2
Others	2.4	6.3	1.7	7.1	5.9	8.0

Z = less than one-half of one percent

Source : Baseline survey report, Table 3.9 and Followup Appendix B

Table 14.

Table 4.7 Percentage of Households Owning Selected Household Items.

Household Items	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey		
	Baseline	Followup		Total Project Villages	Un-allocated Villages	
					Allocated	Un-allocated
Car	-	-	-	Z	Z	-
Pickup or Minibus	4.1	0.7	2.3	3.9	4.7	5.4
Motorcycle	13.0	15.8	10.5	20.2	17.2	22.2
Bicycle	67.3	70.2	59.5	61.4	64.4	59.3
Radio	87.1	82.7	80.9	85.6	85.3	85.7
Television	6.7	24.2	8.7	29.6	19.4	36.7
Refrigerator	3.2	1.6	4.3	8.1	4.6	10.5
Electric fan	8.2	15.1	16.5	30.5	21.0	37.1
Electric iron	9.1	11.9	14.4	30.6	16.9	40.0
Electric rice cooker	1.9	2.0	3.3	11.8	6.0	15.7
Tricycle	-	5.2	0.8	1.4	1.5	1.4
Sewing machine	16.3	19.3	17.1	26.7	26.7	26.7
Drawing cart	50.4	53.9	50.9	66.8	66.6	66.9
Mean number of items owned	2.8	3.0	3.0	3.7	3.5	4.1

Z = Less than one-half of one percent

- = No observation in this category

Source : Baseline Appendix B, Table 12 and Followup Appendix B, Table 5

Table 4.8 Percentage of Farm Households Owning Selected Farm Assets.

Farm Assets	Previously Allocated Villages		Total Project Villages Baseline	Followup Survey .		
	Baseline	Followup		Total Project Villages	Allocated Villages	Un-allocated Villages
Farm Tractor	1.3	3.0	1.6	4.3	2.1	5.9
Animal draw cart	19.1	19.6	25.7	22.4	27.4	18.6
Farm truck	2.3	3.8	1.3	3.5	2.5	4.1
Pumping machine	5.9	-	9.4	-	-	-
Sprayer	28.7	28.5	25.4	26.8	30.0	24.3
Treshing machine	2	-	-	2	2	2
Rice mill	2	1.1	1.5	2.9	4.1	2.0
Fencing around farmland	4.1	6.6	5.0	12.5	14.3	11.1
Farm truck that uses pumping machine as an engine	2	0.8	2	2.2	3.1	1.5
Mean number of items owned	0.6	0.6	0.7	0.8	0.8	0.7

2 = Less than one-half of one percent

- = No observations in this category

Source : Baseline Appendix B, Table 23 and Followup Appendix B, Table 13

Table 5.3 Percent Distribution of Project Village Farm Households by Perception as to Helpfulness of Project for Improving Standard of Living of Village Farmers by Farmer Type.

Perception of Project	Project Farmers			Non-Project Farmers
	Total, All Project Farmers	Farmer Leaders	Pilot Farmers	
Total Households Reporting	12813	661	2857	9296
Very helpful	45.2	49.9	56.0	41.6
Somewhat helpful	49.9	50.1	42.9	52.0
Not helpful	2.1	-	1.1	2.6
Don't know, no opinion	2.8	-	-	3.8

- No observation in the category

Source : Followup Table 52 (Appendix B)

Table 5.8 Percent Distribution of Project Farmers by Assessment of Change in Standard of Living Following Receipt of Land Certificate by Farmer Type.

Perceived Change in Standard of Living	Total, All Project Farmers	Project Farmers	
		Farmer Leaders	Pilot Farmers
Total Households Reporting	12741	661	2836
Better off	76.9	75.0	86.1
No change	18.8	25.0	11.2
Worse off	-	-	-
Don't know, no opinion	4.3	-	2.6

- No observation in this category

Source : Followup Survey Table 58 (Appendix B)

Table 5.9 Percent Distribution of Project Village Farm Households by Perception as to Helpfulness of Agriculture Extension Service by Farmer Type.

Perception of Degree of Helpfulness	Total, All Project Farmers	Project Farmers			Non-Project Farmers
		Farmer Leaders	Pilot Farmers	Project Farmers	
Total Households Reporting	12813	661	2857	9296	1231
Helpful	53.1	67.5	67.5	47.7	34.6
Somewhat helpful	41.0	32.5	32.5	44.7	41.8
Not helpful	1.5	-	-	2.6	8.5
Don't know, no opinion	4.4	-	-	-	15.1

- No observations in this category

Source : Followup survey Table 61 (Appendix B)

Table 5.11 Percent Distribution of Project Farmer Households by Perceived Change in Standard of Living Since Beginning Participation in the Land Settlements Project By Farmer Type.

Perceived change in Standard of Living	Total, All Project Farmers	Farmer Leaders	Pilot Farmers	Project Farmers
Total Households Reporting	12751	661	2857	9243
Better off	84.3	83.5	95.0	31.0
No change	13.3	16.5	5.0	15.6
Worse off	0.1	-	-	0.1
Don't know, no opinion	2.3	-	-	3.3

- No observations in this category

Source : Followup Survey Table 67 (Appendix B)

**Annex F. SUMMARY OF PROJECT IMPLEMENTATION DATA**

**Implementation Results**

**As of August 31, 1984**

**LAND SETTLEMENTS PROJECT**

**493-0289**

**Presented to**

**LAND SETTLEMENTS PROJECT EVALUATION TEAM**

**Prepared by**

**The Northeast Regional Office of the Land Settlements Project  
Self-Help Land Settlement Division  
Department of Public Welfare**

**October 8, 1984**

Implementation Results as of 31. August 1984

Land Settlements Project 493 - 0289

Land Settlement	Project Target	Distributed to Members (Actual)	Approved But not Distributed	Under Consideration at D.P.W	Being Processed at Settlement
Len Han Oon	1,464	783	306	375	-
Khan Soi	1,516	891	-	547	78
Len Pao	2,648	1,361	1,287	-	-
Hay Luang	2,558	2,067	491	-	-
Phuocart	4,000	2,884	644	472	-
Len Fa Khong	2,434	1,469	573	257	-
No. Song	1,884	1,346	269	269	135
Cholrat Dam	10,000	4,776	2,843	1,497	-
<b>Total</b>	<b>26,504</b>	<b>15,577</b>	<b>6,413</b>	<b>3,417 (12.89 %)</b>	<b>1,097 (4.14 %)</b>
RE: 3 Already approved		<b>21,990 (82.97% )</b>			

Agriculture Extension  
Number of Staff by Settlement

Land Settlement	Target for Project	Actual		
		1982	1983	1984
Lan Nam Oon	5	3	6	5
Kham Soi	5	4	5	5
Lan Pao	9	4	7	9
Huay Luang	9	5	6	9
Prasart	13	4	7	12
Lan fa Khong	8	4	8	8
Non Song	6	4	6	6
Ubolrat Dam	33	4	18	30
<b>Total</b>	<b>88</b>	<b>32</b>	<b>63</b>	<b>84</b>

Project Members

Land Settlement	Target for Project	Actual		
		1982	1983	1984
La Han Oon	1,464	400	1,464	1,464
Khan Soi	1,516	400	1,516	1,516
Lan Pao	2,648	452	2,151	2,648
Huy Luang	2,558	500	2,100	2,558
Prasert	4,000	397	2,400	4,012
Lan Ta Khong	2,434	400	1,800	2,471
Non Song	1,884	315	1,800	1,884
Uoolrat Dam	10,000	419	5,700	10,000
<b>Total</b>	<b>26,504</b>	<b>3,284</b>	<b>19,931</b>	<b>26,533</b>

Pilot Farmers

Land Settlement	Target For Project	Actual		
		1982	1983	1984
Lam Nam Oon	146	40	146	146
Kham Soi	151	40	150	151
Lam Pao	264	40	211	264
Huay Luang	255	50	210	255
Prasart	400	32	240	400
Lam Ta Khong	243	30	180	326
Non Song	188	45	180	188
Ubolrat Dam	1,000	37	570	1,000
<b>Total</b>	<b>2,647</b>	<b>314</b>	<b>1,887</b>	<b>12,730</b>

Leader Farmers

Land Settlement	Target For Project	Actual		
		1982	1983	1984
Lam Man Oon	30	8	30	30
Kham Soi	30	8	16	30
Lam Pao	53	8	42	53
Huay Luang	51	10	42	51
Prasart	80	8	48	80
Lam Ya Khong	48	6	36	48
Non Song	37	6	36	37
Ubolrat Dam	200	7	114	200
<b>Total</b>	<b>529</b>	<b>61</b>	<b>364</b>	<b>529</b>

Native Poultry Improvement

Land Settlement	Results - 1982			Results - 1983			Results- 1984		
	Pilot Farmers	New Cages	Mixed Breed Chicks	Pilot Farmers	New Cages	Native Roosters Exchanged	Pilots Farmers	New Cages	Native Rooster Exchanged
Lae Nam Con	40	5	110	45	45	45	56	56	17
Kham Soi	40	4	121	40	40	17	64	64	-
Lae Pao	40	6	92	85	66	85	25	25	-
Huy Luang	50	6	179	85	78	65	20	20	10
Pravart	32	6	372	107	79	79	48	48	-
Lae Pa Khong	30	4	246	60	40	-	20	20	-
Nen Song	45	5	65	70	70	70	70	70	70
Utalrat Dam	37	4	215	260	260	-	495	495	-
<b>Total</b>	<b>314</b>	<b>40</b>	<b>1,400</b>	<b>752</b>	<b>678</b>	<b>361</b>	<b>798</b>	<b>798</b>	<b>97</b>

Rice Production

Variety	Results - 1982		Results - 1983		Results - 1984
	Average Yield Kg/rai	Increase Over Traditional	Average Yield Kg/rai	Increase Over Traditional	
RD 6	414	48	502	162	1984 Results are not available.
RD 8	321	21	-	-	
RD 15	-	-	459	113	
Dok Mali 105	470	70	435	69	
Siew Mai Jan	-	-	376	196	
Hang Yee 71	300	-	525	225	

Fruit Tree Orchards

Settlement :	Results - 1982			Results - 1983			Results - 1984		
	Pilot Farmers	Trees Planted	Number Survived	Pilot - Farmers	Trees - Planted	No. Survived	Pilot - Farmers	Trees - Planted	Number - Survived
Lan Kam Oon	40	580	518	16	256	228	22	352	352
Elan Soi	40	400	347	35	345	321	33	1,700	1,700
Lan Pao	40	128	119	34	2,429	2,027	40	640	640
May Luang	50	160	142	34	442	388	30	480	272
Frasert	32	886	767	40	1,080	745	32	768	768
Lan Ta Khong	30	627	589	20	494	410	52	724	641
Kon Song	45	160	148	28	636	215	30	480	480
Chalrat Dam	37	626	502	52	2,100	1,987	30	750	750
<b>Total</b>	<b>314</b>	<b>3,487</b>	<b>3,132</b>	<b>259</b>	<b>7,782</b>	<b>6,321</b>	<b>269</b>	<b>5,894</b>	<b>5,603</b>

Forest Tree Plantation

Settlement	Results - 1982			Results - 1983			Results - 1984		
	Pilot - Farmers	Trees - Planted	Number - Survived	Pilot - Farmers	Trees - Planted	No. Survived	Pilot - Farmers	Trees - Planted	Number - Survived
Lan Nam Con	40	3,500	2,816	81	14,000	6,630	22	2,280	2,280
Kham Noi	40	2,800	1,710	162	7,295	6,821	4	15,700	15,700
Lan Lao	40	115	62	34	7,050	6,340	-	-	-
Huay Luang	50	1,160	157	34	1,700	986	-	12,120	6,345
Prasart	32	8,000	6,215	54	10,476	6,126	-	-	-
Lan Ya Khong	30	2,200	1,400	37	5,950	4,486	-	4,500	4,500
Hong Song	45	190	82	28	1,012	400	-	-	-
Ubolrat Dam	37	3,850	2,100	110	20,480	11,020	68	47,600	47,600
<b>Total</b>	<b>314</b>	<b>21,815</b>	<b>14,542</b>	<b>540</b>	<b>67,883</b>	<b>42,849</b>	<b>94</b>	<b>82,200</b>	<b>76,425</b>

**Fisheries**

Settlement	Results - 1982			Results - 1983				Results - 1984		
	Pilot-Farmers	Number of Ponds	Seed Fish Stocked	Pilot - Farmers	Number of Ponds	Total - Yield - kg	Total - Benefit	Pilot - Farmers	Number of Ponds	Comments
Lan Han Oon	3	3	3,850	29	29	1,305	23,200	12	13	1984 Results are not available
Dam Sri	9	9	9,000	11	11	330	4,675	11	31	
Lan Pao	19	19	52,000	17	17	850	15,725	10	10	
May Luang	5	5	1,200	17	17	1,275	25,500	6	6	
Prasert	17	17	3,495	24	24	1,680	34,200	48	48	
Lan Ya Khoug		-	-	21	21	1,155	20,055	21	21	
Ban Soug	5	5	13,000	23	23	1,680	31,625	30	30	
Ubalrat Dam	24	24	15,100	52	52	2,080	36,400	99	99	
<b>Total</b>	<b>82</b>	<b>82</b>	<b>97,645</b>	<b>194</b>	<b>194</b>	<b>10,285</b>	<b>19,1380</b>	<b>237</b>	<b>237</b>	

Variable Production

Settlement	Results - 1982	Results - 1983			Results - 1984		
	Pilot Farmers	Pilot Farmers	Gross Field value (Baht)	Not benefit (Baht)	Pilot Farmers	Total Yield (kg)	Total benefit (Baht)
Lar Nam Oon	34	68	13,620	10,400	20	1,200	2,400
Ehem Soi	36	34	14,607	9,607	110	4,000	3,312
Lau Pao	19	17	7,565	765	-	-	-
Huy Luang	39	17	24,903	18,103	20	7,702	29,145
Presart	40	31	12,400	4,400	16	-	24,000
Lan To Khong	27	-	-	-	-	-	-
Hoi Sons	40	14	28,000	22,400	30	-	-
Ubalrat Dem	37	52	26,000	5,200	165	-	-
<b>Total</b>	<b>272</b>	<b>233</b>	<b>126,475</b>	<b>70,875</b>	<b>361</b>	<b>12,902</b>	<b>58,858</b>

Field Crop Production

Variety	Results 1983		Results 1984
	Average Yield - Kg /rai	Increase Over Traditional	
Groundnut	184	36	<u>1984</u> Results are not available
Mungbean	116	29	
Soybean	122	35	
Maize	240	108	
Kenaf	180	45	

Composing.

Settlement	Results - 1983			Results - 1984		
	Pilot Farmers	Gross value: (250/ton)	Variable costs	Net benefit	Pilot Farmers	Total Yield - kg
Lea Nam Oon	8	1,250	400	850	12	700
Kham Soi	37	10,500	1,850	8,650	110	7,500
Lea Pao	20	8,500	1,000	7,500	-	-
Huay Luang	17	1,500	850	650	45	3,825
Prasrt	40	6,000	2,000	4,000	-	-
Lea Ta Khong	15	500	750	- 250	-	-
Non Song	14	1,750	700	1,050	-	-
Ubolrat Dam	52	6,250	2,600	3,650	165	-
<b>Total</b>	<b>203</b>	<b>36,250</b>	<b>10,150</b>	<b>26,100</b>	<b>332</b>	<b>12,025</b>

Mushrooms

Settlement	Results - 1983			Results - 1984		
	Pilot Farmers	Gross Field Value	Net benefit (B <sup>ht</sup> )	Pilot Farmers	Total Yield (Kg)	Net benefit (B <sup>ht</sup> )
Lam Nam Oon	8	5,300	3,700	161	691	12,340
Kham Soi	11	2,750	550	33	113	3,948
Lam Pao	71	25,500	22,100	-	-	-
Huay Luang	17	3,800	2,360	12	152	760
Pra sart	60	26,511	22,511	32	94	2,115
Lam Ta Khong	13	3,183	583	50	611	13,750
Non Song	24	6,000	3,200	20	250	-
Ubolrat Dam	52	12,740	2,340	165	-	-
<b>Total</b>	<b>256</b>	<b>85,784</b>	<b>57,344</b>	<b>473</b>	<b>1,911</b>	<b>32,913</b>

Fruit Propagation

Activities Implemented in 1984 Only

Land Settlement	Pilot Farmers		Fish Fingerling Production For Sale	Chinese Bamboo Planting
	1983	1984		
Lam Nam Oon	1	1	Lam Nam Oon Land Settlement had one member.  Production for 1984 Cyprius carpio = 23,000 Field value = \$ 4,600  Puntius gonionotus = 5,000 Field value = \$ 1,500	Lam Ta Khong L.S.=53 Pilot Farmers Total Area Planted = 44 rai Total Tree Planted = 1,000
Kham Soi	1	-		
Lam Pao	1	-		
Huay Luang	1	1		
Prasart	1	-		
Lam Ta Khong	1	8		
Non Song	1	1		
Ubolrat an	3	3		
<b>Total</b>	10	14		

Training

Trainees	1982			1983			1984		
	Target	Actual	%	Target	Actual	%	Target	Actual	%
1. Administrator and Superintendents # times	2	2	100	1	1	100	1	1	100
2. Extension Staff # Trained	3	3	100	3	3	100	4	4	100
3. Pilot Farmers # Trained	800	799	99.9	1,546	1,554	100.5	994	994	100
4. Leader Farmers # Trained	60	59	98.3	180	177	98.3	290	290	100
5. Project Members # Trained	-	-	-	-	-	-	2,300	2,151	93.52

Road Construction

Land Settlement	Target 1983 - 1984			Results %	Comments
	Main Road	Feeder Road	Bridge		
Lam Nam Oon	4.650	24.220	1	88.23	Road Construction for Ubolrat Dam - 1982 Main Road = 23.652 Km Feeder Road = 17.254 Km Bridge = 1 Site
Kham Soi	8.515	5.250	1	62.23	
Lam Pao	16.034	14.716	1	97.96	
Huy Luang	17.027	10.010	-	100	
Prasrt	18.231	20.337	-	100	
Lam Ta Khong	15.109	9.490	2	100	
Non Soing	12.083	13.828	1	96.20	
Ubolrat Dam	7.732	19.081	5	96.10	
<b>Total</b>	<b>99.372</b>	<b>116.932</b>	<b>11</b>	<b>92.59</b>	

Water Supply Construction

Laud Settlement	Target 1983 - 1984						Results	Comments
	Shallow well	Deep well	Pond	Rainwater Tank	Weir	Total		
Lam Nam Con	6	2	8	7	2	25	100	Pond = 3 Sites Rainwater Tank = 5 Sites Water Supply at Ubolrat Dan L.S 1982
Kha Soi	6	6	14	3	-	30*	100	
Lam Pao	4	8	13	10	3	38	100	
Itay Luang	7	4	16	2	1	30	100	
Prasart	4	12	16	7	-	39	100	
Lam Ta Khong	4	1	22	6	2	35	100	
Non Song	4	1	17	2	2	26	83.36	
Ubolrat Dan	49	-	6	1	4	60	84.48	
<b>Total</b>	<b>84</b>	<b>34</b>	<b>112</b>	<b>38</b>	<b>14</b>	<b>283</b>	<b>95.98</b>	

\* Pipe distribution system = 1 village

Activity of People Participation

Variety Land Settlement	Auditorium	Bank of Rice	Shallow well	Total	Results to Date %
Lam Man On	3	-	-	3	-
Kham Soi	3	1	4	8	71.25
Lam Pao	6	-	9	15	57
Huay Luang	5	1	1	7	78.14
Frasart	4	1	-	5	94
Lam Ta Khung	5	-	-	5	-
Non Song	1	-	3	4	85
Ubolrat Dan	2	-	3	5	94
Total	29	3	20	52	59.92

Annex G. MAJOR AGRICULTURAL EXTENSION AND RESEARCH SUB-PROJECTS

Activities initiated by the Project included:

1. Improvement of backyard poultry production.
2. Improvement of cultural methods for rice production and the rice based cropping system.
3. Fruit tree orchard promotion.
4. Fruit tree propagation.
5. Vegetable gardening.
6. Composting.
7. Fisheries/agriculture promotion.
8. Fish fingerling production and sale.
9. Community, public and private woodlots.
10. Mushroom cultivation.
11. Field crop systems improvement.
12. Eradication of papaya ring spot virus.
13. Chinese bamboo promotion.

Special activities initiated by the Project included:

1. Leucaena leucocephala seed production.
2. Crotalaria juncea L. (sunhemp) seed production.
3. Soil and water conservation demonstration.
4. People's participation in community development.
5. Village area clean-up and development.
6. Special development by Project volunteers.

Applied Research activities of the Project included:

1. Department of Agrigulture
  - Rice producting improvement.
  - Alley cropping Leucaena leucocephala/field crops.
  - Intercropping cassava/groundnut.
  - Groundnut seed production.
  - Black sesame production.
  - Mungbean after rice.
  
2. Department of Land Development
  - Analysis of soil erosion and run-off at Ubolrat Dam Land Settlement.
  
3. Khon Kaen University
  - Improvement of backyard poultry production at the village level.