CONFIDENTIAL

Report No. 770

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

# PROJECT PERFORMANCE AUDIT REPORT

# ON

# THAILAND VOCATIONAL EDUCATION PROJECT

# (LOAN 471-TH)

June 13, 1975

Operations Evaluation Department

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Note: Currency Equivalent (Baht)

US$ 1 = Baht 20.75

## SUMMARY

Loan 471-TH for US$6.0 million was extended to Thailand in September 1966 to assist with the financing of a vocational education project, comprising three main components: 1) new construction and renovation at existing institutions including 14 trades and industries schools (vocational level, grades 11-13), 9 agricultural schools (vocational and technical levels, grades 14-15 ) and supporting teacher training institutes, one for trades and one for agricultural teachers; 2) equipment for the project schools; 3) technical assistance for project implementation and curricula development. The Bank's loan covered the cost of equipment while the Thai Government financed civil works. Technical assistance advisors provided by USAID were assigned to a Project Unit created in the Ministry of Education, and to the project's teacher training schools, to assist with teacher training as well as development of new curricula for the project vocational schools.

The project, prepared with UNESCO assistance, was appraised by the Bank in November 1964 and justified as a means to increase the supply and improve the quality of skilled and semi-skilled manpower for Thai industry and agriculture.

In addition to the above-mentioned Project Unit, the Bank required retention of a consultant architect, to be responsible for preparation of final designs and supervision of the construction/renovation program. Loan conditions were standard in nature and a supplementary letter covered educational objectives, the most important of which called for: attracting teacher trainees with industrial or agricultural experience; coordination of vocational curricula with the needs of Government services and private enterprises; and, adequate provision of consumable student materials and textbooks.

The project's three components were fully carried out but the period of implementation was extended from three to seven years, due mainly to delays with equipment procurement under the Bank's Loan. The original closing date, June 30, 1970, was postponed four times and the final disbursement was made in May 1974.

All new construction was completed by 1969, as scheduled, and renovation works, delayed by roughly two years, were completed by the end of 1971. All civil works contracts were awarded to prequalified local contractors, who were supervised by the consultant architect. The quality of completed works is satisfactory but there is a substantial amount of structural overdesign in project schools and an excess of classroom space, both attributable in part to inadequate supervision of the consultant architect by the Project Unit during the early stages of implementation. Thus far, building maintenance has been adequate.

Procurement of equipment, carried out by the Project Unit with assistance from USAID advisors, was meticulously organized in accordance with Bank guidelines for international competitive bidding; but recommended bulk purchasing was not employed. Further, an average delay of three months between bid opening and contract award slowed the procurement process considerably. While other project components had been fully implemented by the end of 1971, procurement and installation of equipment were not completed until 1974. The installed equipment is well maintained.

USAID direct-hire advisors worked closely with Thai counterparts in the Project Unit as well as with two teams of contracted advisors attached to the project's teacher training schools. With assistance from the field teams, new curricula were introduced in the project trades and agricultural schools during 1970. In addition, USAID, as well as the Government, financed a total of 200 overseas fellowships for Thai teachers under the project.

The total cost of the project, US$21.72 million equivalent, excluding technical assistance, exceeded the appraisal estimate by only 3.4%. (A 9% overrun in the construction category, due to rising prices, was offset by savings in other categories.) However, substantial savings in construction costs could have been made by building with concrete and brick rather than the more expensive concrete and steel used. In addition, under the project, all equipment items were imports of high quality. Allowances for off-the-shelf purchase of smaller items available locally might have reduced equipment costs as well as the delays associated with procurement under the project. (In more recent Bank education projects, such procedures have been permitted.)

Enrollment and output targets have been largely achieved. For the trades schools, a 1972 output of 2,154 students, slightly exceeded the 1971 target of 2,110. For the agricultural schools, including the teacher trainees and technical level students, the 1972 output exceeded the targeted 1,425 by 3%. The output of trades teachers has been reduced from a planned 250 to 149 (for 1972) as a result of a lengthening of the program from two to three years.

The project vocational schools have adequate numbers of teachers, but an absence of sufficient administrative staff has forced teachers to spend substantial time in performance of administrative tasks with only 24 out of 40 hours per week spent in activities directly related to teaching. The goal of retaining teachers with practical experience has not been achieved.

New vocational curricula are well balanced with 50% of students' schedules allocated for shop or farm practice and 50% for core and theoretical subjects. There is some underutilization of laboratory equipment, perhaps due to inadequate allocations of student's time for experiments. In accordance with loan conditions, the supply of student materials and textbooks has been satisfactory.

Results of a 1973 Bank tracer study, carried out for a sample of project school vocational level graduates, showed that 57% of trades school graduates were employed but a growing proportion, 42%, were continuing on to higher education; of the agricultural graduates, 70% were employed, but 44% were working in fields outside of agriculture; and 26% were pursuing further studies. These early results suggest that about one half of recent trades school graduates and one fourth of agricultural graduates are meeting the project's original manpower objective. The growing demand for access to higher level education explains why many students want to continue on to higher levels of education. However, the training provided at the project schools should be carefully reviewed; it may be that the project schools' specialized programs (each student chooses one of six industrial or one of five agricultural streams to follow for three years),and the relatively sophisticated equipment utilized, will have to be changed to better meet the present needs of Thai industry and agriculture. Further, in terms of recurrent costs per student, the project schools, while low by international standards, are more costly (by 38% for trades and 87% for agricultural schools) than comparable non-project Government schools. While a recent Ministry of Education study suggests an improved quality of project over non-project graduates, as measured by starting salaries, recurrent costs would have to be lowered to allow for a more widespread application of the project-type program. As a first step, student/teacher ratios at the project schools should be raised to the planned 15:1 in contrast to the present lower ratios of 9:1 in trades and 12:1 in agricultural schools.

The implementation of this project was a successful example of close cooperation among the project implementing authorities -- the Project Unit, USAID and the Bank. Participation by the Bank was concentrated mainly in the preparation and implementation of civil works and equipment procurement, in line with the Bank's education policy of the late 1960s. The Bank can be credited with reducing the number of the project trade schools to 14 (originally 26 trades schools had been included) and thus the costs of the first phase project; this has allowed adequate time for a review of operating outcomes prior to a further spread of the project-type schools. The Bank's insistence on early retention of project advisors also showed correct judgment (although the last of the advisors arrived only by 1968) as an attempt to avoid implementation

delays. The requirement for retention of a consultant architect was also an appropriate decision as the Ministry of Education, at the time, lacked experience with the higher quality of construction planned for the project schools. Some of the overdesign observed in the completed construction and equipment programs might have been eliminated, however, had the Bank invested a small amount of time, beyond appraisal, to help initiate further review of the appropriateness of design standards and master equipment lists.

With regard to procurement, the Bank could not have foreseen the major delays which arose in connection with application of the required procedures. Though recommendations were made, the Bank did not succeed in its attempts to streamline the process during the main period of implementation. Perhaps more importantly, the strict adherence to international competitive bidding may have been unwarranted in view of the large number of small items procured.

# PROJECT PERFORMANCE AUDIT MEMORANDUM

## THAILAND VOCATIONAL EDUCATIONAL PROJECT (LOAN 471-TH)

### Introduction

This memorandum reports on a performance audit of the results of the Thailand Vocational Education Project for which Loan 471-TH of 1966 was fully disbursed in May 1974. It is based on a study of the Project Completion Report (PCR) prepared by the Bank's East Asia and Pacific Regional Office, and of relevant documents and important materials from the Bank's files, on discussions held with Bank staff involved in the project,and on a brief mission to Thailand in November 1974 to gather additional project data and impressions from past and present project officials and to visit a few of the project schools. This memorandum gives a comprehensive assessment of the project and of the Bank's participation in it, with special emphasis on the preparation and construction phases while the PCR, which is attached and was based on more intensive investigation in Thailand, deals more fully with the educational aspects of the project.

### The Project

The Thai Government originally expressed an interest in obtaining IDA assistance for the expansion of general secondary education during 1962. A UNESCO educational planning mission, requested by the Government, reviewed all proposed education projects suitable for external assistance in 1963 and assigned the highest priority to a group of vocational and higher education projects. The Bank (IDA), making known its then preferred support of vocational education, participated in a preparation mission with UNESCO in June 1964. The mission proposed a project for Bank assistance, comprising expansion and improvement of existing schools including 26 upper secondary (grades 11-13) trades and industries schools, originally set up under a SEATO skilled-labor project; nine upper secondary agricultural schools; four supporting vocational teacher training institutes, three for the trades and one for the agricultural schools; and a substantial technical assistance program including overseas fellowships for project school teachers. The project was to be implemented over a six-year period at an estimated cost of from US$30.0 to US$35.0 million equivalent.

The Bank appraisal mission, undertaken during November-December 1964, found the project generally well-justified and feasible but recommended a major reduction in the number of trades schools mainly to conform more closely with roughly estimated manpower requirements and an anticipated shortage of qualified teachers of technical subjects for several years. The Government agreed to reduce the number of trades schools from 26 to 14 and the related teacher training institutes from three to one, under a smaller and less costly first phase project to be implemented over three years. Further cost reductions were obtained, at Bank suggestion, by decreasing the amount of new construction and increasing the amount of renovation and by revising schedules of accommodation to reflect more economical space standards; the final cost estimate was US$21.0 million equivalent.

The appraisal mission justified the project as a means to increase the supply of skilled and semi-skilled personnel for expanding industry and modernizing agriculture. In the absence of large scale in-service and non-formal training programs, the project schools were expected to fulfill an important training function for the Thai economy. (Planned annual outputs from the project vocational schools were based on preliminary assessments of manpower requirements and on employer surveys.) Higher standards of instruction and better and more equipment were necessary to improve the quality of the vocational school graduates, as was improved training of vocational teachers. The output of vocational teachers would be increased to meet the requirements of the expanded project vocational schools. Thewes College was designated as the project's training institute for trades teachers and Bang Pra for the preparation of agricultural teachers.

Final Bank recommendations and requirements for the project were submitted for Government review in May 1965 in the form of a revised appraisal report. In addition to reduction of the trades school item, two further modifications were incorporated into the report. The Bank had reduced the number of teachers to receive overseas training under the project from 150 to 22, arguing that for the level of instruction to be provided at the project schools, there was little advantage in sending such a large group. The Thais argued, however, that the possibility for study abroad was very helpful for recruiting capable teachers: the Bank agreed that a larger number of fellowships could be granted if additional participants were financed outside of the project. The Bank had also reduced the number of planned agricultural diploma (technical) level graduates (grades 14-15) at four of the project's agricultural schools from 180 to 90 per year, in light of employment prospects; an output of 110 was agreed upon.

In order to improve overall project effectiveness, the Bank requested pre-negotiations assurance from the Government that initial steps would be taken to increase the low salary scales for vocational teachers and to develop other incentive programs to attract capable teachers with experience in agriculture and industry; to develop a comprehensive program for improvement of agricultural services; and, to begin a systematic collection of manpower data to be utilized in coordinating output of the educational system with labor market opportunities. By August 1965, the Bank judged progress, or intent, regarding these conditions satisfactory and negotiations were undertaken during September.

Three important outstanding issues were finally resolved during the negotiations meetings. The question of Thailand's eligibility for an IDA credit had been left open at appraisal time. However, the Bank's 1964 Economic Report reconfirmed Thailand's creditworthiness for borrowing on conventional terms. The Bank was prepared to make a loan for 50% of the total estimated US$21.0 million equivalent cost of the reduced project (excluding technical assistance). Mainly as a result of the decision on Thailand's creditworthiness, however, the final amount requested by the Government was much smaller -- a loan for US$6.0 million equivalent to cover the cost of equipment only. The remaining US$15.0 million equivalent for construction/renovation, including US$4.0 million in foreign exchange, was to be met by a low interest loan (US$8.0 million equivalent) from the Bank of Thailand and from budgetary funds (US$7.0 million equivalent).

Secondly, after project appraisal, the Bank had reviewed the work of the Design Division of the Department of Vocational Education (DVE) of the Ministry of Education (MOE) and found that the Unit, in charge of all Government school construction, was already working to capacity and that no improvements in traditional design standards, which tended to lead to early deterioration of buildings, were being made. The Bank recommended retention of an independent consultant architect to take charge of design and supervision of the project's construction/renovation program. The Thai authorities argued (as had UNESCO prior to negotiations), that the Design Division, appropriately strengthened, could satisfactorily carry out the program. The Bank/IDA was insistent, however, and during negotiations the Thais formally agreed to retain an independent supervisory consultant architect.

Finally, the Bank and the Thais had agreed that a number of expert advisors should be retained to assist a Project Unit with overall project implementation and specifically with procurement. And, for the implementation of educational requirements, mainly curricula development, one advisor for each of six trades and five agricultural programs offered at the project schools was to be hired.1/ The Thais planned to seek bilateral assistance for provision of these advisors to avoid increasing local project expenditure and had begun discussions with USAID shortly after appraisal. By the time of negotiations, USAID had informally agreed to provide all necessary advisors.

A Project Unit had been organized within the DVE, and a Project Director designated before negotiations took place. However, to avoid unnecessary payment of commitment charges by the Government and to shorten the length of time between the signing of an agreement and effectiveness and disbursements, the Bank postponed the signing of the Loan Agreement until after the consultant architect and all technical advisors had been appointed. A contract with an architectural firm, Junzo Sakakura of Japan, was not signed until September 1966, over a year after negotiations. In the same month, a USAID-Thai agreement covering provision of all technical assistance advisors was finalized.

With all pre-conditions fulfilled to the satisfaction of the Bank, the Loan Agreement was signed on October 19, 1966. The Agreement was standard in content, with the exception of a special covenant calling for the creation of a permanent central purchasing agency in MOE. A supplementary letter on educational objectives covered projected enrollments and outputs at project vocational and teacher training schools, as well as qualitative objectives including: a continuing attempt to recruit teacher trainees with industrial or agricultural extension experience; provision of in-service training to upgrade the quality of science teaching and of other non-technical subjects; coordination of vocational curricula with the needs of Government and private industrial and agricultural services and enterprises, including the creation of local employer advisory committees for each project school; upgrading of supervisory and administrative personnel both in DVE and in the

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1/ The trades schools offered programs in building construction, auto-mechanics, machine shop, welding and sheet metal, electricity, and radio and telecommunications. The agricultural programs included crop production, animal production, agricultural engineering, agricultural economics and agricultural extension.

project schools; and, MOE provision of an adequate supply of consumable student materials and improvement of the situation with regard to a shortage of suitable textbooks.

The project, as finally proposed, comprised: 1) construction/renovation works, to be financed by the Thai authorities, at 14 trades schools, 9 agricultural schools, one vocational teacher training college and one agricultural teacher training college; 2) equipment for the 25 project institutions, to be financed by the Bank's loan; and 3) technical assistance, to be financed by USAID, including Project Unit advisors, teacher training and curricula development advisors and overseas training for Thai teachers.

Project Implementation

The Loan Agreement became effective on December 29, 1966, immediately after the Bank had received and approved the Government's legal opinion. The project's three components, construction/renovation, procurement and installation of equipment, and the technical assistance program were all fully carried out but the period of implementation was extended from the planned three, to seven years, due mainly to delays with equipment procurement under the Bank's Loan. The original closing date, June 30, 1970, was postponed four times and the final disbursement was made in May 1974.

Civil Works

Construction, followed by renovation works at 20 of the 25 project schools, was to be carried out between 1967 and 1969. Most new construction, comprising buildings (mainly workshops, laboratories, cafetoriums, farm buildings and additional classrooms), housing and utilities, was completed by the end of 1969, but the renovation of existing buildings was not completed until late 1970 and fences and roads were completed only by the end of 1971.

An initial delay of eight months resulted from inadequate supervision of the consultant architect by the Project Unit, in turn largely due to a vacancy in the position of Project Director beginning in September 1966. In spite of Bank pressure, a full-time Acting Director was not appointed until October 1967; he was officially confirmed as Director in 1968. With inadequate guidance, the consultant firm had calculated educational space requirements on maximum standards, increased the amount of new construction and raised the cost estimate for civil works by about 50% (including some rise in prices since appraisal). At Bank request, working drawings and specifications were revised and cost estimates brought down to the appraisal level mainly by eliminating new construction in favor of renovation works.

Tender documents for the first phase of implementation, new construction, were completed by January 1968 and for the second phase renovation by early 1970. All civil works contracts were awarded to pre-qualified Thai contractors. New construction was underway by June 1968, but problems with obtaining imported materials and construction equipment caused further minor delay. In some cases less experienced contractors were slow in placing orders and in others, deliveries were late. The overall civil works delay, about one year for renovations and two years for road construction, did not

seriously hamper school operations. Most of the project schools were in full use by mid-1970.

The quality of construction and renovation was satisfactory. Frequent supervision by the consultant architect, the Project Architect and DVE architects led to early correction of faulty works though some problems, resulting from lax specifications, remained after completion: notably, most timber works had not been termite-proofed and detailing of certain workshop and farm features was inadequate.

The consultant architect's contribution to supervision of construction/renovation and to the overall efficiency of the implementation of the civil works program was helpful but, from an architectural standpoint, the finished schools reflected substantial over-design of structural elements (PCR 4.03). In addition, educational and administrative space proved overly generous. The most obvious example of structural and space excesses, as well as some impracticality, is found in the cafetoriums, built as the focal point at each of the schools. The proportion of steel to concrete used in these structures is greater than necessary and slabs and beams are overly massive. The cafetoriums are also larger than necessary for dining and auditorium use. Wide overhangs prevent most of the horizontally driving monsoon rains from entering the main structure, but the absence of walls is ill-suited to effective use of the cafetorium as an auditorium, due to poor acoustics.

There is also a significant element of over-design in the farm buildings at the agricultural schools. While structurally simple, they were constructed to much higher standards (using concrete posts and timber roofs) than average Thai farms and to cater for operations superior in scale and sophistication. A longer useful life of the project farms justifies the use of the higher standards. But construction of farm buildings to cater for more limited and simple operations would have been adequate to meet training objectives.

Careful study of Thai conditions, both natural and technological, by the consultant architect could have led to the use of adequate but less expensive and more practical design standards. As it was, the consultant lacked familiarity with the Thai situation; suggested revisions were not made by the Ministry's own architects, who at the time were unfamiliar with the generally new and higher standards called for under the project's construction/renovation program; and, the Bank did not play an active role in review of final design standards (a task normally ascribed by the Bank to the Project Architect except in cases of substantial projected overruns -- due to manpower and budgetary constraints).

In respect of maintenance of project school buildings, their newness and durability have so far limited the need for heavy expenditures and the schools appear generally well-maintained. The Bank supervision missions noted, however, that maintenance allocations were on the low side, at US$15,000 equivalent for all 25 project schools in 1970, and began to recommend future increases.

Procurement

All equipment for the project secondary schools and teacher training institutes was procured in accordance with Bank guidelines, through international competitive bidding, and 100% financed from the Bank's Loan. Substantial delays with procurement implementation are reflected in the rate of disbursements, shown in PCR Annex Table 6. At the time of final Loan disbursement, a small unused amount, US$95,000, was cancelled.

The procurement of equipment was carried out by a procurement section in MOE, as the Loan Agreement required, and under the guidance of the Project Unit. The Project Unit was directly assisted by two advisors, one for industrial and one for agricultural equipment as well as by the two curricula development teams, all supplied by USAID under the bilateral technical assistance program. Initial preparation of equipment lists was delayed several months by the late arrival, during March 1967, of the first USAID advisors. The first equipment lists, for the trades schools, were submitted for Bank approval during 1967 but the first agricultural lists were not submitted until 1969, due in part to the even later arrival, in 1968, of the five-member agricultural curricula team. In both cases, the Bank required some revisions, mainly deletions of a few large expensive items which it considered too sophisticated for teaching purposes at the grade 11-13 level. The only significant change made in the original master list was the elimination of the procurement of imported livestock under the Loan: local procurement through the Ministry of Agriculture was judged more practical.

Appraisal plans called for the preparation of 12 bid packages, one for each of the six trades and five agricultural programs offered at the project schools, and one for miscellaneous equipment. While the advantageous organization of equipment by teaching area was maintained, it proved impossible to place all items into so few packages and the number grew to 24 over the extended implementation period. The first bids were invited in early 1968 and the first equipment began to arrive at the Port of Bangkok in 1969 but deliveries were completed only by 1974.

The meticulousness of the organization of the procurement program, while commendable, was in part the cause of delayed implementation. Bids were evaluated with assistance of academic staff committees supported by the USAID curricula teams. The DVE gained experience from this process, but on average the lag between bid opening and contract award was three months. /Included was an average 42 day lag between the time Thai authorities sent, and the Bank received and approved the bid documents for award of contracts (PCR 7.09)./

The receipt and testing of equipment was very efficient. Goods were uncased and tested, in most cases with suppliers' agents present, before being dispatched to the schools or the warehouse of the MOE Maintenance and Supply Division (MSD). However, a substantial portion of equipment, US$1.1 million worth or 18% of total, arrived damaged (PCR 7.07). The damaged equipment posed a major obstacle to equipment distribution scheduling and much of the resulting delay was attributable to the method of payment to suppliers. Only 10% of payment was made after equipment

inspection, with 90% having been forwarded upon initial delivery to the Port of Bangkok. Many suppliers, unconcerned by the small amount of payment outstanding, forfeited. In some cases, legal action was taken to obtain replacement parts. However, much of the damaged equipment had to be repaired by the MSD, placing an unanticipated burden on its limited staff and creating a demand for storage facilities in excess of available space.

Distribution was further delayed as a result of refusal by the Express Transport Organization (ETO), a Government unit, to dispatch less-than-full truckloads to up-country schools, and in some cases by schools that were not ready to receive equipment (PCR 7.08).

After 1970, some improvements were made in distribution. Upon Bank suggestion, initial payments to suppliers were reduced to 40% and the response of suppliers to requests for replacement parts and repair of damaged equipment improved though fewer bids and slightly higher prices were reported (PCR 7.07). Port clearance was reduced from a month to two weeks after the ETA agreed to clear equipment through the Port for inspection at MSD (in addition to crating and transporting the equipment); final delivery was made within two weeks thereafter.

The efficiency of the procurement process would have been much improved if the number of contracts (590 in all) and the individual requests for reimbursement (1,113) had been reduced. A practice of dividing delivery of a single item into several shipments contributed to the large number of reimbursement requests, since two payments were necessary for each shipment, one upon delivery and one after inspection. More use of bulk purchasing and ordering would have speeded implementation as would a streamlining of reimbursement procedures by the Thais: combining applications for reimbursement, permissible under Bank guidelines wherever the currency of payment was the same, was not employed. Further efficiency might also have been obtained if, as is current DVE practice whenever possible, international competitive bidding had been used only for heavy equipment and other goods unavailable locally.

The quality and quantities of all equipment items were judged satisfactory by the Bank and maintenance of installed equipment has been adequate. Early in the implementation of the procurement program the USAID advisors had recognized the need for storage facilities at the Port and at MSD, and had assisted the Project Unit in securing warehouse space. The advisors, at their own initiative, also assisted MSD and teaching staff by holding seminars on installation and repair of equipment.

Furniture for the project schools was procured and financed locally. All orders were placed in August 1969 under three large contracts with Bangkok suppliers. In spite of failure of the largest contractor to meet specifications, and the time he needed to produce an acceptable quality of furniture, all furniture had been received at the project schools by mid-1970, about one-half year behind schedule.

Technical Assistance

Assistance with procurement, previously discussed, was given by four direct hire USAID staff, the equipment and procurement advisors and one general project advisor. Their close cooperation with immediate counterparts, as well as with the two curricula field teams, was maintained throughout project implementation. Under the guidance of the USAID direct hire advisors, all required technical assistance programs were carried out.

A six-member USAID-contracted university team arrived at Thewes College in 1967 and remained through 1972. It led curricula development for Thewes College and for the vocational trades schools, assisted with preparation of equipment lists and workshop layouts and conducted seminars on the use of the new curricula and on equipment installation. At the Bang Pra agricultural teacher training facility, a second five-member team assisted with project implementation at the agricultural schools from 1968 until 1973, performing much the same tasks as the trades team. Both groups assisted in the development of pre- and in-service teacher training programs, with the introduction of in-service training for school administrators and with development of improved methods for DVE supervisory services at the national and provincial levels.

In the course of project implementation, slightly more than 200 fellowships for overseas study or training (75% in trades, 25% in agriculture) were granted. Of the recipients, 159 were sponsored by the Government and 49 by USAID. The 22 fellowships officially included under the project were fully utilized and upon return to Thailand, the counterparts worked closely with the USAID field teams, though not all have stayed with the DVE or in the project schools. All but seven fellowship recipients undertook studies or training in the United States and most had returned to Thailand by 1973.

Though not originally included under the project, technical assistance was also received for land and water development at the project agricultural schools. A 1968 FAO report had recommended that soil surveys be undertaken and land-capability and land-use maps be prepared as a basis for proper farm planning at the agricultural schools. The Bank agreed on the need for farm planning and urged the Thais to carry out the survey studies. In 1969, USAID supplied an advisor for land and water development and promised to donate heavy land moving equipment for implementing the final farm development plans. The preliminary surveys were completed by late 1970 and a schedule for implementing the development plans at the project schools, at the rate of three per year, was elaborated. Implementation has, however, been slower than planned due to a shortage of land development and irrigation specialists, in spite of a number of appropriate fellowships granted in the later stages of project implementation, and to inadequate budgetary allocations.

Project Costs

The total cost of the program, including fellowships and technical assistance, which were financed mainly by USAID at US$10.68 million, was

US$32.4 million equivalent. Project expenditure excluding technical assistance and fellowships, shown on the PCR table (PCR 5.05), totalled US$21.72 million equivalent, 3.4% over the appraisal estimate. Only the civil works category suffered an overrun: actual expenditure for this item was US$14.92 million equivalent, 9% greater than the appraisal estimate of US$13.69 million equivalent. The overrun was due mainly to rising construction costs. A higher overall overrun was avoided mainly by lowering expenditures on furniture and land and from savings derived by reducing the design responsibility of the consultant architect: MOE architects produced the designs and specifications for all renovation works. As a result, design fees were only 5% of construction costs, though 10% had been allocated. In all, the Government contribution, for land, construction/renovation and furniture, was US$15.82 million equivalent, 5% higher than the appraisal estimate.

While construction costs were considered reasonable at the time, architectural design standards employed by DVE since the project have been reduced, as have relative costs. Under the project, costs for new construction averaged US$55.0/$m^2$ for classrooms, housing, laboratories and administrative premises and US$50.0/$m^2$ for workshops. According to DVE staff, these costs could have been cut considerably without damaging the quality of school operations, and without even reducing space standards. For the relevant period (1968-70), DVE has supplied lower estimates of US$45-50/$m^2$ for classrooms, etc., and US$30/$m^2$ for workshops. The savings would have been derived from use of less expensive concrete and brick structures, instead of steel and concrete, and from procurement of accessories through local importers: the consultant had imported Japanese accessories and electrical fixtures which were costly and in some cases inappropriate.

The appraisal estimate for the additional recurrent costs to be generated by the completed project was about US$950,000 equivalent per annum. No breakdown of this cost on a per student basis was given. Actual total recurrent costs of the project schools in 1972, based on an enrollment of 12,744 students (824 in excess of planned) and an average per student cost of US$216.0 equivalent for the sample group of project schools visited by the PCR mission, were in the range of US$2.75 million equivalent. In the absence of detailed information for the project schools prior to implementation, a meaningful comparison of estimated and actual recurrent costs generated by the project cannot be made. However, project schools' total recurrent costs represented a minimal 0.3% of total Central Government recurrent expenditures and 1.4% of Central Government public education recurrent expenditures in 1972. Overall, recurrent public education expenditure in Thailand grew more rapidly than expected, from US$99.0 million equivalent in 1967 to US$201.2 million by 1972, representing 20% of total Government recurrent expenditures in 1972.

While low by international standards (PCR 5.03), the average recurrent costs per student at the project schools (US$216 equivalent in 1972) are higher than those for comparable non-project Government schools, as shown below for both trades and agricultural schools (in US$ equivalents using 1973 data):

| | Non-Project Government Schools | Project Schools | % Project/ Non-Project |
|---|---|---|---|
| Trades | 140 | 193 | 138 |
| Agricultural | 172 | 322 | 187 |

Source: DVE

In contrast to project schools, non-project schools must allocate larger portions of smaller budgets for teachers' salaries and often inadequate amounts and lesser portions for maintenance and student materials. A breakdown of recurrent costs per student by category of expenditure is given below for all Government upper secondary trades schools (including the project schools) and for the project schools alone:

US$ equivalent-1973

| | All Government Trade Schools1/ | % Total | Project Trade Schools2/ | % Total |
|---|---|---|---|---|
| Teacher Salaries | 117 | 73 | 112 | 57 |
| Other Remunerations | 5 | 3 | 12 | 6 |
| Materials | 32 | 20 | 58 | 30 |
| Central Administration | 7 | 4 | 13 | 7 |
| Total | 161 | 100 | 195 | 100 |

1/ Data obtained from DVE.

2/ Breakdown derived from average for sample project trade schools, PCR Annex 2B.

Note: An accurate breakdown for the agricultural schools is not available.

The figures indicate that a better educational environment is provided at project, as compared to non-project schools, but at considerably higher recurrent costs, particularly at the project agricultural schools.

The significantly higher recurrent cost per student at the agricultural schools as compared with trade schools, has been shown above for both project and non-project schools. The average recurrent cost per student at the project agricultural schools, US$322 equivalent, was 67% greater than that of the trades schools, at US$193 in 1973. Salaries and boarding expenditures account for the major differences. Agricultural

teachers are mainly university graduates, while trades teachers have generally received, at most, a technical certificate. Boarding expenditures are higher at the agricultural schools which are equitably dispersed and located in more remote areas; the trades schools are attended mainly by day students.

Operating Outcomes

Enrollment and output targets at project schools have been satisfactory. The schools have been sufficiently staffed but significant improvement in retention of teachers with practical experience in industry and agriculture has not been achieved and the student-teacher ratio is uneconomically low. New improved curricula were introduced at the project schools in the 1970 academic year, as planned, and some improvement in the quality of graduates has been observed, as measured by initial earnings. Early results indicate a very low unemployment rate among graduates though the proportion of vocational level trades graduates continuing on to higher education has been increasing for the trades schools, as has the proportion of agricultural graduates employed outside of agriculture.

In view of operating outcomes to date, it appears that the higher average operating costs of the project schools as compared with other vocational level Government schools (previously discussed) are not excessive in the case of the trades schools. For the agricultural schools the cost differential is far greater (87%); operating costs would have to be lowered if the project-type agricultural schools were to be further spread through Thailand.

Teachers

Enrollments of students at the project teacher training institutes have been in line with those planned (PCR Annex Table 6) but annual output at Thewes has been less than the targeted 250, at 149 in 1972, due to a lengthening of the trades and industries teacher training program from two to three years (PCR 6.12). The targeted annual output of 25 agricultural teachers from Bang Pra has been reached.

A rapid turnover of better qualified teachers with practical experience has continued mainly because salary increases and incentive improvements have been minimal. In accordance with Bank loan conditions, a small salary increase of US$15.0 equivalent per month was effected in 1970 but it applies only to project school teachers who received overseas training: salaries in private enterprises are considerably higher and therefore more attractive. Promotion incentives are also inadequate; the possibility for promotion depends purely on academic achievements and tenure rather than quality of teaching. While new curricula at the teacher training institutes place much more emphasis on practical techniques than in the past, most trainees have had little or no experience in industry or in the practice of farming. Lack of teacher experience and to some extent lack of familiarity with new instructional emphases have so far prevented full implementation of new curricula at the vocational schools.

The average weekly workload for teachers in the sample project schools visited by the PCR Mission was 40 hours but only 24 hours were spent in activities directly related to teaching with a low 12 hours of direct student contact per week. In the absence of sufficient administrative staff, teachers are forced to spend a substantial amount of the remaining 16 hours per week performing administrative tasks. The resulting student to teacher ratios are lower than the planned 15:1, averaging 12:1 for agricultural and only 9:1 for trades schools, and should be increased (PCR 3.03).1/

Curricula

The new vocational curricula place an increased importance on practical training, with 50% of the students' weekly time schedules devoted to workshop or farm practice and the rest to core subjects and shop-related theory (PCR 6.04, 6.05). Outside of the practical courses, traditional teacher-oriented learning dominates. Of the core subjects, student performance in English suggests a need for an improved quality of teaching, and science teaching continues to focus too much on theory, allowing inadequate time for student experimentation (PCR 6.06, 6.08). As required, appropriate textbooks have been developed for major subjects and supply is adequate with the exception of science books (PCR 6.07).

Utilization of Facilities

While laboratory and workshop space is appropriate at project schools, there is an oversupply of classrooms by as much as 50% in some cases (PCR 4.04): schedules of accommodation were completed by the consultant architect; however, the necessary educational orientation was hampered by the absence of a full-time Project Architect. Further, the only source for information on educational requirements were headmasters, who asked for more than the economic minimum with regard to classroom facilities. (Under current Bank appraisal requirements for completing detailed educational worksheets, the possibility of such error has been largely eliminated.) In the science laboratories some equipment is underutilized, possibly due in part to inadequate time allocated in student schedules for experiments (PCR 4.04). In spite of an ample supply of consumable student materials, some equipment is also underutilized in the workshops (PCR 4.05, 4.08). In addition, in the last couple of years, there has been a substantial amount of criticism of the types of equipment

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1/ An increase of six students per teacher at the project trades schools would lower the recurrent cost per student for teachers' salaries from US$112 equivalent (see p. 10) to US$66 equivalent, thus reducing the total recurrent cost per student at the schools from US$193 to US$149 equivalent, only 6% above the comparable non-project school cost. A similar but smaller reduction in recurrent costs per student could be achieved at the project agricultural schools if student/teacher ratios were raised from the existing 12:1 to the planned 15:1.

procured under the project by DVE and USAID staff and by the Asian Regional Team for Employment Promotion. Much of the trades equipment is more sophisticated than that found in the prevailing small- and medium-sized industries outside of Bangkok. For the agricultural schools, equipment provided at nurseries, dairies and poultry and swine stables is generally suitable for large-scale modern farming, barely existent in Thailand, rather than for improvement of traditional farming practices. In some cases farm equipment is also inappropriate for local soil and climate conditions (PCR 4.08). In general, simpler less costly equipment could have met student training needs satisfactorily. Under the project, light equipment and even tools, all of fine quality, were imported. These items, manufactured to lower but adequate standards, could have been purchased locally at substantially reduced costs.

Student Enrollments and Output

Enrollments at the project trade schools, totalling 7,992 in 1972, exceeded the 1971 target of 6,940 by 15% (PCR Annex Table 4). A 1972 output of 2,154 was slightly above the planned 2,110. At the agricultural schools, actual enrollments of 4,224 in 1972 fell short of planned by 5% while an output of 1,425 (including teacher trainees and technical level graduates) exceeded estimates by 3%. During implementation, the number of planned enrollments at the vocational agricultural level were reduced to allow for an increased number of students at the technical level: technical level output was 446 in 1972, instead of the 110 originally agreed upon (PCR 6.12).

Demand for entrance to the project schools is high; on the basis of the sample school survey, the PCR Mission found an acceptance ratio of 1 in 4 in 1973 (PCR 6.14). Appropriate aptitude tests for admittance have been developed, but in practice they are not important. Previous academic performance continues to be stressed, in opposition to the project's manpower objective of providing skilled labor. This outcome is symptomatic of a larger problem: many students enter the vocational schools only because they have not been accepted into upper secondary academic programs. An open-ended system further complicates the situation since upon completion of the vocational courses, many students reapply for entrance into academic institutions. Recommendations for limiting the enrollments in higher education, particularly academic, to improve the system, have been made.

The PCR Mission made use of a graduate tracer system, built into the project at Bank suggestion, to determine the activities of a sample of 1972 graduates of all project schools, twelve months after graduation. Results showed that of the trades school graduates, 57% were employed, and 42% had continued on to higher education, leaving only 1% unemployed (PCR 6.13). The proportion of students continuing on in school represented a significant growth over previous years and is an indication of the growing demand for, and increased availability of, facilities for higher education. The review of sample agricultural project school graduates for 1972 showed 70% employed, 26% studying and 4% unemployed (PCR 6.16).

The lower proportion of agricultural graduates -- vis a vis trades graduates -- furthering their education is not readily explainable. In part, the discrepancy may be due to sociological differences in student backgrounds. The trades students are mainly from urban areas, with greater exposure to the benefits of higher education and easier physical access to facilities while most agricultural students come from more rural, though not necessarily agricultural, backgrounds. The increase in the number of agricultural graduates employed outside of agriculture, from 14% of a 1967 sample to 44% in 1972, is partially explained by the so far limited possibilities for agricultural employment of vocational level graduates outside of Government extension, and by a lack of student interest in practical farming. It would be premature, however, to conclude that none of this group would ever work in agriculture-related activities.

Recently the DVE undertook a study to measure "product acceptability", based on a single indicator -- starting salaries for project school graduates in the private sector. While not conclusive, results suggest that on average, project school graduates make higher salaries than non-project graduates, 15% for vocational and 27% greater for technical level graduates. These salaries ranged from US$40.0 equivalent per month for vocational graduates of the building construction program to US$55.0 equivalent for graduates in automechanics. The results of this study suggest an improved quality of output at the project schools as compared with non-project vocational school graduates.

In line with curricula design, the vocational level students specialize in only one field. Concentration in one area is appropriate for employment in the large Bangkok industries but is not as well-suited to the more general needs of small-scale enterprises. Further, to date there has been a tendency for vocational level trades graduates to be locked into starting positions with limited possibilities for promotion. In some cases, the smaller businesses are unable to absorb the graduates while in others the graduate's training is inappropriate to the needs of a growing business: success with local curricula advisory committees, required under the project, has so far been negligible due to a lack of time and interest among small- and medium-sized businessmen. The problem is less severe for agricultural vocational level graduates: of those employed, most work for the Government and after two years of service, the Government will pay for continuing education. The youth of the vocational level graduates also works against early career development. Recent DVE data indicate that technical level graduates (with two more years of training) of both trades and agricultural, project and non-project schools, have had more success with job placement and promotion opportunities.

## The Bank's Role

Bank financial assistance for the Thailand Vocational Education Project was limited to equipment procurement but the Bank participated in the preparation and implementation of both the construction/renovation and equipment programs. During implementation, supervision missions dealt thoroughly with the two programs and followed up on related Bank recommendations for increasing the efficiency and economy of implementation.

A less substantive role was played by the Bank with regard to implementation of the technical assistance program and achievement of the project's educational objectives, but progress and problems in these areas were covered in supervision reports.

Regarding the size of the project, the Bank's requirement for a reduced number of project trade schools was well-founded. The implementation of the smaller, less costly first phase project, as a means to introduce and evaluate the suitability of the new and higher quality school buildings and equipment and new vocational curricula, prior to further application, was appropriate. In terms of timing, the Bank's requirement for appointing all technical assistance advisors, before signing the Loan, also showed correct judgment since firm appointment of all advisors was made only one year after negotiations (though the last team of USAID advisors arrived only during 1968). The creation of a Project Unit, agreed upon to reduce the heavy burden of the Ministry of Education, was also a positive contribution to strengthening project management in the Ministry. Despite the detrimental effect of the absence of a Project Director during the early implementation period, the Thai counterparts, working directly with the three USAID Project Unit advisors, gained valuable experience in project management.

Vis-a-vis the construction program, Bank recommendations for eliminating unnecessary new construction, in favor of renovation, and for reducing space standards, eliminated some unnecessary project costs. The Bank's insistence on retention of a supervisory consultant architect, basically a correct decision, had a less positive effect: the need for technical assistance for the implementation of the construction/renovation program was evident but the consultant's lack of experience in Thailand, coupled with an inadequate review of the suitability of final design standards, by the Project Unit and the Bank (as a result of normal Bank procedures), resulted in well-constructed but generally over-designed school buildings. A somewhat similar problem has been observed with the equipment procured under the project: workshop items reflect a degree of unnecessary sophistication in view of existing manpower opportunities. The Bank's few early requests for elimination of overly elaborate equipment were appropriate but more items might have been deleted, or replaced by less complex items, without jeopardizing achievement of training objectives.

Some of the excesses observed in the completed construction and equipment programs might have been eliminated prior to project implementation had the Bank more forcefully pursued its original appraisal emphasis on improving the economy and likely effectiveness of the project. The Bank might have contributed a small but additional amount of staff time, beyond appraisal, to assist with initiation of further review of the appropriateness of construction master plans and equipment lists by the Project Unit, in advance of arrival of the consultants. Such review, carried out during the two-year interval between appraisal and loan signature, might have lent impetus to improvement of basic data and supporting project information from which the consultant architect, other project advisors and the DVE could have benefitted. The outcome may or may not

have been beneficial, given the absence of facilities comparable to those included in the project and the lack of reliable manpower data. However, the Bank was aware that the DVE was inexperienced with the higher quality of construction and equipment to be introduced under the project. Given the foreseeable delay with retention of consultants, it would not have been unreasonable to assume that further review and improvement of project items be undertaken.

In respect of procedures for procurement of equipment, the Bank's insistence on the use of international competitive bidding provided valuable experience to the DVE procurement unit. As a result of that experience the Thais have found that where possible, the local procurement of equipment is simpler, less costly and adequate. The Bank could not have foreseen the difficulties which arose in connection with the procurement process, but once the problems became evident the Bank did make recommendations which speeded procedures after 1970. The Bank did not, however, succeed in reducing the number of reimbursement applications and might have continually recommended combined requests. Overall, it appears that for this project, strict adherence to conventional Bank procurement procedures was unwarranted -- especially in view of the large number of small equipment items procured. (Current Bank procedures as employed by the East Asia Region do allow for local competitive bidding for contracts under US$50,000 and for procurement of miscellaneous items through standard Government procedures.)

Outside of the construction/renovation and procurement programs, Bank participation was limited. Among the few important contributions made were the continual Bank emphasis on the need to raise vocational teachers' salaries and the suggestion to build a graduate tracer system into the project. The Bank did not participate at all in the development of new vocational curricula for the project schools. However, the programs and facilities are flexible enough to allow for curricula changes and improvements as newly available information may warrant.

## Conclusions

The vocational education project in Thailand has proved to be a successful example of coordination and cooperation among project implementing authorities, in this case, the official Project Unit, the Bank and USAID. The project was efficiently implemented, with the exception of an extensive delay with equipment procurement. All loan conditions were fulfilled, though two -- the establishment of local curricula advisory committees and an improved rate of retention of project school teachers with industrial or agricultural experience -- have met with minimal success and require further improvement. The capital costs of the project's construction/ renovation items and equipment procurement exceeded the appraisal estimate by only 3%. Nonetheless, substantial savings could have resulted from use of simpler architectural designs, reduced space standards and less sophisticated equipment, without hindering the achievement of the project's educational objectives.

The project's effectiveness with regard to educational objectives has been satisfactory to date. Overall enrollment and output targets have been met with the exception of output of trades teachers, due to a lengthening of the training period. New curricula are well-balanced and despite the rapid turnover of teachers with practical experience in industry and agriculture, the learning environment and quality of training have, on the basis of early findings on graduates' earnings, suggested an employer preference for project over non-project vocational level graduates of trades and agricultural schools. In part this may be due to the higher quality general educational background of project school students; admissions standards are higher at the project schools. The project schools have also made vocational education a more attractive alternative for students not accepted into upper academic secondary schools, but desiring further education.

Despite the above successes with project operating outcomes, there is a significant need for improving the efficiency of operations; use of higher student-teacher ratios would off-set some of the uneconomical operating costs without damaging educational quality. Further, there are some indications that curricula (including the utilization of relatively sophisticated equipment), are too specialized for available mid-level manpower opportunities. In order to improve the effectiveness of the now completed project, a continuing effort is necessary, especially in the areas of coordination of curricula and student enrollments with manpower needs (PCR 6.15). In addition, to the extent possible in light of increasing demand for access to higher education, a system of controls limiting the large numbers of vocational graduates continuing directly on to higher education should be implemented.

PROJECT COMPLETION REPORT

THAILAND VOCATIONAL EDUCATION PROJECT

## The Project Data

| | | | |
|---|---|---|---|
| 1.01 | Borrower | - | Kingdom of Thailand |
| | Amount of Loan | - | US$ 6 million |
| | Date of Loan Agreement | - | October 19, 1966 |
| | Effective Date | - | December 29, 1966 |
| | Original Closing Date | - | June 30, 1970 |
| | Final Closing Date | - | May 13, 1974 |
| | Period of Grace | - | Ten Years |
| | Term of Loan | - | Thirty Years |

1.02 The project aimed at improving the quality and increasing the output of trade and industry schools and agricultural schools to alleviate a shortage of skilled manpower. This was to be effected by improving the facilities for instruction in industrial and agricultural training, including schools engaged in technical and agricultural teacher training.

1.03 The project comprised the following:

(a) new construction, renovation of existing buildings, and equipment for the following institutions:

(i) 14 trade and industry schools (grades 11-13);
(ii) one vocational teachers' college (grades 14-15);
(iii) nine agricultural schools (grades 11-13); and
(iv) one agricultural teacher training college (grades 14-15);

(b) technical assistance as follows:

(i) six expatriate consultants to assist in a 5-year vocational teachers' training program and curricula development;
(ii) five expatriate consultants to assist in a 5-year agricultural teachers' training program and curricula development;
(iii) overseas training for Thai teachers in both agriculture and trade and industry.

1.04 The estimated cost of the project (excluding technical assistance) of US$ 21 million was financed by the Bank loan of US$ 6 million (29 percent), a loan from the Bank of Thailand of US$ 8 million (38 percent), and the remainder by the Government of Thailand. Technical assistance was provided through a grant by USAID. The Bank loan was used to finance equipment while the financing of land, construction and furniture was the responsibility of the Thai Government and the Bank of Thailand.

1.05 During the course of implementation, the Closing Date was first extended to February 28, 1972, then to August 31, to December 31, 1973, and finally May 13, 1974, due primarily to problems in procurement.

Summary

2.01 The first Bank education project in Thailand (471-TH) aimed at improving the quality and increasing the number of graduates from 14 trade and industry schools and 9 agricultural schools to provide the labor market with skilled workers. It was also designed to improve teacher training in industry and agriculture. It comprised equipment financed by the Bank, technical assistance provided by USAID and building construction financed by the Thai authorities. Final costs are close to the appraisal estimates despite increases in building costs but the implementation period had to be extended from four years to seven years (paras. 5.05, 5.06 and 7.06).

2.02 Project school facilities are in good condition, satisfactorily maintained and well utilized. There is, however, some over-supply of classrooms and under-use of science laboratories. The learning equipment is also adequate, well maintained and used although some farm machinery appears redundant. The schools have a sufficient supply of consumable materials but the allocation for library books should be increased (paras. 4.04-4.09).

2.03 The technical assistance programs in industrial and agricultural teacher training provided by USAID were well integrated with the Bank-financed program and of high quality. New curricula and learning materials were developed. A fellowship program to train teachers was instrumental in providing qualified teachers (para. 4.10).

2.04 The project school teachers are qualified and well motivated but teaching loads could be heavier. The teaching methods in workshops and laboratories are acceptable although the classroom instruction is traditional and teacher-centered. The student-teacher ratio is relatively low and could be increased without endangering the quality of instruction. The curricula are suitable and meet the training objectives although more time should be given to laboratory practice in science and to English language teaching. Student performance and attitude are good and the products from workshops and farms are of good quality (paras. 6.01-6.06).

2.05 The project has been successful in increasing the number of vocational school graduates and it has achieved the projected targets. It is also successful in reaching all segments of Thai society, particularly those at the lower end of the income scale. The ability of the schools to foster upward social mobility is evidenced by the fact that the majority of the students have received considerably more education than their parents (paras. 6.09, 6.12).

2.06 Project school graduates are in demand by the labor market and the unemployment rate (4%-7%) is low considering the age group. There is some overproduction of graduates in the machine shop, welding and sheet metal trades. Increasing percentages of trade and industry school graduates proceed to further education and greater numbers of agricultural school graduates enter employment outside agriculture (paras. 6.13-6.17).

2.07 Administration of the project schools is efficient but attempts to establish a close cooperation with local enterprises have largely failed (paras. 7.03, 7.04).

2.08 Administrative procedural arrangements have caused project delays and there have been problems with equipment found damaged on delivery. The project unit, assisted by USAID staff, has served the project well. Bank supervision missions have provided useful technical assistance during project execution (paras. 7.05-7.10).

Recommendations

3.01 In view of the important support given to project implementation by the USAID technical assistance team provided in this project, the Bank should encourage similar participation from bilateral agencies in future education projects. Whenever appropriate, technical assistance should support:

(a) preparation of equipment lists and equipment procurement;

(b) updating of curricula and related in-service teacher training; and

(c) fellowship programs for teacher training.

3.02 The Bank should ensure that Borrowers are kept fully aware of its procedures for disbursements in order to avoid unnecessary voluminous and cumbersome paper work (para. 7.10).

3.03 The Bank should suggest to the Government that it should:

(a) explore ways to limit the number of trade and industrial school graduates proceeding to further education;

(b) review the demand for machine shop, welding and sheet metal workers and adjust the school programs accordingly;

(c) explore ways to increase the interest in practical farming among the agricultural school graduates;

(d) pay increased attention to the teaching of science and English in the teacher training colleges; and

(e) endeavour to achieve a more economical student-teacher ratio.

## THE REPORT

### General

4.01 In 1963 the Government of Thailand, with assistance from UNESCO, conducted an educational investment study which was followed by a UNESCO/IBRD project preparation mission in 1964. The project which comprised vocational schools for agriculture and industry was appraised by the Bank in November-December, 1964, and presented to the Executive Board in October, 1966. The interval between appraisal and presentation to the Board was unusually long because it was agreed with the Thai Government that "considerable progress in the engagement of technical advisers and agricultural consultants should be made before presentation".

### Physical Execution of the Project

#### Civil Works

4.02 None of the project schools were new insitutions; all had been in existence for an average of 20-25 years. The project provided additional teaching accommodation and staff housing; old buildings were renovated and new workshops constructed and equipped. The consultant architects were Japanese but construction and renovation was done by local contractors. All new buildings were completed and in use by mid-1970.

#### Trade and Industry Schools

4.03 The standards of architecture and construction are satisfactory but certain aspects can be questioned as follows: (a) some of the structural elements of the new buildings appear "over-designed" with unnecessarily massive beams and slabs; (b) a few buildings do not have adequate protection from horizontally driving rain during the monsoon; (c) most timber work has not been termite proofed; and (d) the wooden slats used in louvre-type windows are not appropriate to local climatic conditions.

#### Classrooms and Laboratories

4.04 There is an oversupply of classrooms, in some cases as much as 50 percent. Laboratories are fully utilized and adequately supplied with water, electricity and propane gas. With some minor exceptions, the quality of laboratory equipment is good, well maintained and suited to the students' needs. However, there is some underutilization of

equipment in the chemistry and physics laboratories[1/], possibly because the timetable allows insufficient time for students' laboratory experiments. Maintenance and cleanliness are good.

Workshops and Equipment

4.05 Each school has six workshops, one in each of the following trades: auto mechanics, machine shop, welding and sheet metal, electricity, radio and telecommunications and building construction. All workshops are fully utilized. The order and cleanliness of toolrooms in all workshops are exemplary and there is ample supply of consumable teaching and learning materials. Maintenance is adequate and all machines are cleaned daily by the students. Except for fuel injection machines in the auto mechanics shop (the most obvious case), all equipment appears well utilized.

Library

4.06 Measured by standards of most developing countries, current library facilities are adequate and well utilized by the students although the capacity and resources vary widely among the schools. The average number of books was 3,200, including 50 sets of textbooks, the latter mainly in English which somewhat decreases their usefulness. Seating capacity ranged from 50 to 110. All school libraries subscribe to daily newspapers and to weekly or monthly magazines. Most schools do not have a professional librarian but teachers perform librarian duties on a part-time basis. Data are incomplete but the annual budget allocation for new books appear low at about US$300.

Agricultural Schools

4.07 The comments made on the school buildings of the trade and industry schools (para. 4.03) apply equally to the agricultural schools. The architectural design of the farm buildings is simple but design and construction materials are superior and more expensive than those found on local farms. Facilities are adequate, well maintained and, for the most part, well utilized.

Workshops and Equipment

4.08 All agricultural schools have one machine shop where students are taught to use, maintain and repair farm machinery and equipment. Maintenance and cleanliness are adequate but these shops are not as well organized nor as fully utilized as in the trade and industry schools. Equipment is somewhat sophisticated and appears geared to large scale farming. There is under-utilization of some farm machinery because it is unsuitable for the local soil and climate (e.g., ploughing and sowing machines and liquid fertilizer distributors).

Nurseries, Dairy Farming, Poultry and Swine Stables

4.09 These facilities, with minor exceptions, are well organized and maintained, possibly because the agricultural schools supplement their budget by sales of plants, milk, eggs and pigs. However, milking and

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1/ In one school, crates containing glassware were still unpacked after 2-3 years.

pasteurizing equipment are inappropriate for the need and are not fully used.

Technical Assistance

4.10 This was provided by USAID under four main headings:

(i) a headquarters team of project advisers, three equipment specialists and a procurement adviser, located adjacent to and in support of the project unit. It provided valuable help from 1967 until project completion in 1973 in the preparation of equipment lists, tender documents and the evaluation of bids, as well as providing liaison with the two "field" units referred to below;

(ii) technical assistance at Thewes Vocational Teachers' College given by six consultants from Oklahoma State University (OSU) during 1967-1972. The team developed curricula for the trade and industry schools and prepared course outlines, guide sheets, shop manuals, visual aids and timetables. In addition, the OSU team helped with equipment lists, advised on workshop layouts and conducted seminars on the use, the new curricula and the installation of equipment for Thai teachers.

(iii) technical assistance at the Bang Pra Agricultural Teacher Training College, comprising five specialists from the California Polytechnic Institute (CPI), who served during 1968 to 1973. They prepared curricula with careful consideration to local resources and conditions and assisted in the pre- and in-service training of agricultural teachers;

(iv) about 200 fellowships and scholarships for overseas teacher training. Approximately 75 percent were in industrial training and the remainder in agriculture. Apart from a few grants in agricultural education in the Philippines, all training was undertaken in the United States. At the time of the completion mission, most teachers had returned to Thailand and were teaching in the project schools.

4.11 The technical assistance provided by USAID seems to have been well integrated with the work of the Department of Vocational Education (DVE) and particularly with project requirements. The close cooperation between the expatriate experts and their Thai counterparts and the fellowship program were instrumental in the successful implementation of the project and in providing an adequate number of trained teachers.

Costs and Financing of the Project

5.01 Expenditures in education, which have been growing at about 13 percent per annum for the last five years, amounted to about 5.5 thousand million Baht (US$280 million), representing about 3.6 percent GDP, compared with 3.4 percent at the time of project appraisal in 1964, and 20 percent of the National Budget. A comparison with other developing countries shows that the Borrowers' expenditures on education are acceptable: data from 55 developing countries show that the median value of percentage of GDP devoted to education is 4.0 percent and the median percentage of public expenditures devoted to education is 17.5 percent 1/. Expenditures of DVE increased at an average annual rate of 22 percent between 1967 and 1969, the construction phase of the project, to a record high of 417 million Baht (US$20.9 million), decreased sharply in the following years and are expected to decrease even further in 1973 to about 348 million Baht (US$17.4 million). This decline is due almost exclusively to reduced expenditures on land purchasing and building construction; expenditures on salaries, materials and supplies show moderate but steady increases.

5.02 The financial structure of the trade and industry schools is significantly different from that of agricultural schools (Annexes 4A and 4B). About 60 percent of total expenditures in trade and industry schools are for salaries, 30 percent for materials directly related to education and 10 percent for other materials and miscellaneous expenses. The corresponding percentages in the agricultural schools are 40, 30 and 30. This distribution of expenditures ensures sufficient teaching and workshop supplies. By contrast, a visit to a non-project trade and industry school revealed some shortages; the school spent 77 percent of its budget in salaries, 21 percent in materials directly related to education and only 2 percent in maintenance, other materials and miscellaneous expenses.

5.03 The difference in recurrent expenditures per student between agricultural schools and trade and industry schools is somewhat higher than seems educationally justified. Salaries and boarding expenses are responsible for part of the difference but average total expenditures per student are 68 percent higher in the agricultural schools (US$272) than in the trade and industry schools (US$162). However, available data from the Bank's Comparative Education Indicators suggest that the average cost per student in the Thai project schools compares favorably with that of other developing countries. In 1972 the average cost per student for all Thai project schools visited was about US$216, or about 30 percent lower than the average of 15 developing countries.

5.04 Tuition, dormitory and food charges vary from school to school. The average tuition and dormitory fees per school year in trade and industry schools are US$9 and US$15 respectively. The tuition fees in agricultural schools are higher (US$25) and the dormitory fees are lower (US$5). Annual

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1/ IBRD, Central Project Staff, Comparative Education Indicators.

food cost for boarding students is US$100 in all institutions. These amounts are not high in absolute terms, but they should not be increased in view of the low family income of the average student.

5.05 The actual total cost of the project, excluding the technical assistance component, was US$21.8 million, about 3.8 percent higher than the appraisal estimate of US$21 million. The following table gives a comparison of estimated and actual costs by major project items:

| Project Items | Appraisal Estimate (000's US$) | (%) | Actual Cost (000's US$) | (%) |
|---|---|---|---|---|
| Land | 440.0 | 2.1 | 245.3 | 1.1 |
| Construction | 13,690.0 | 65.2 | 14,917.5 | 68.7 |
| Furniture | 870.0 | 4.1 | 653.1 | 3.0 |
| Equipment | 6,000.0 | 28.6 | 5,905.0 | 27.2 |
| TOTAL | 21,000.0 | 100.0 | 21,720.9 | 100.0 |

5.06 Construction costs exceeded appraisal estimates by nine percent because of a construction boom during the building phase of the project schools. In order to keep costs close to the original estimated, architectural fees, which were an unusually low percentage (about 5%) of construction costs, were reduced by using the Ministry of Education architects to support the Japanese staff. The excess in construction costs was also partially offset by lower total expenditures in furniture and land purchases.

## Operating Results and Forecasts

### 6.01 Teachers and Teaching Methodology

According to data supplied by MOE, there are 8,000 upper secondary school teachers, of which 4,900 teach in vocational institutions. Of the latter group, about 20 percent teach in the project schools. The mission conducted interviews with about 200 teachers, 90 percent of whom are instructors in the project institutions 1/. Considering the type of schools visited, the percentage of female teachers (26 percent) is high, reflecting the increasing role of women in Thai society. The majority of the teachers are young, 77 percent under 37 years of age; well educated, 86 percent having completed at least three years of full-time education beyond secondary school; adequately trained,

1/ The mission found few significant differences among teachers of different institutions. Unless otherwise specified, the discussion in the following paragraphs refers to the total number of teachers interviewed, including 22 teachers from the non-project trade and industry school at Mimburi. Detailed tabulations of the results obtained from the teacher questionnaires are available in the Division Files.

64 percent with at least one year of specialized teacher training; and relatively experienced, 74 percent with more than five years total teaching experience. The project school teachers are better educated than those in the non-project schools but are less experienced. More than 80 percent of the project school instructors teach the subject in which they have received specialized training while this percentage is considerably lower in the non-project school visited (68 percent). Most appeared to keep well abreast of developments in their respective fields.

6.02 School officials estimated the average teacher weekly workload at 40 hours a week but the questionnaires revealed that the average teacher spends only 24 hours a week in activites directly related to teaching (8 hours preparing lessons; 12 hours with students in classrooms, laboratories, workshops or in the field; and 4 hours correcting papers and examinations). The discrepancy may be explained by the lack of administrative staff and so teachers spend a considerable time per week in administration. The low workload is accompanied by a low student-teacher ratio. In the agricultural schools it is 12:1 and 9:1 in the trade and industry schools.

6.03 Instruction in practical subjects is effective and up-to-date with active cooperation between instructor and student but teachers might better encourage students' own initiative. Classroom teaching is somewhat traditional and there is room for more student participation. Classroom instruction is based on lectures rather than on dialogues. Textbooks and student questioning are the aids and techniques mostly used by the teachers. Fortunately, most workshop instructors believe that practice by students is as important as teacher demonstrations. Students' achievements are assessed on the quality of products produced in the workshops or in the field and in teacher-made tests but their performance on special projects is only occasionally evaluated, indicating that there is little incentive for students to initiate their own activities. Although the learning methods in the project schools are somewhat "teacher-centered", the overall impression is that of a dedicated and qualified teaching staff, fully aware of the students' need for employable skills at graduation.

Curricula and Textbooks

6.04 Present curricula in the trade and industry schools, which were developed with the assistance of the consultant team from OSU, were introduced in May, 1970, and have been kept up-to-date by means of annual revisions. The breakdown of the students' weekly timetable between theoretical studies and practical applications is adequate and balanced. At least 50 percent of the timetable is allocated to workshop practice. Theoretical studies are divided into 13 percent for courses related to shop practice and 37 percent to core subjects.

6.05 Revised curricula for the upper secondary and the technical levels of the agricultural schools were introduced in 1970 with the assistance of the CPI team. Curricula are also well balanced with 50 percent of the time

allocated to farm practice or practical work in nurseries and laboratories. Theoretical studies are approximately evenly divided between core subjects and agricultural courses. The curricula are flexible and allow students within each specialization to pursue personal interests by including elective courses. Fields of specialization are crops, animal husbandry, agricultural mechanics, agribusiness and home economics.

6.06 The curricula are thus acceptable and suffer only from two minor deficiencies which have been mentioned by teachers and students alike. Insufficient time is allowed in the science laboratories for experimental work by students. There should also be increased provision for field trips to industrial establishments and farms.

6.07 Textbooks have been developed in major subject areas by project school teachers and the supply is, with the exception of science, satisfactory. Over the last few years, the Vocational Teacher Training College at Thewes has printed over 150,000 textbooks in 13 subjects and has made them available to students at cost. (Annex 5)

Student Performance

6.08 It has been shown in previous paragraphs that the learning environment in the project schools is favorable. The buildings and equipment are satisfactory and the teachers are qualified and interested in their profession. It is shown later that the socio-economic background of the students also supports good performance. The mission followed lessons in classrooms and practices in laboratories and workshops. The impression was positive. Student attention and diligence were exemplary and the samples of student products from the workshops and drawing offices were of good quality. The student proficiency in foreign languages (English) is not outstanding but their achievement in academic subjects appears otherwise satisfactory. The mission tested about 450 students in science to arrive at a deeper knowledge of their academic achievement.

Output and Employment

6.09 The mission interviewed 440 final-year students on their socio-economic backgrounds, vocational aspirations and school attitudes.[1/] Given the type of educational institutions and the stage of development of the country, the high percentage of male students (97 percent) in the project schools is acceptable. The mean age of students is reasonable at 19 years and there are few over-age students. The analysis suggests that the project schools have been successful in reaching all segments of Thai society and in particular those at the lower end of the income scale. The ethnical distribution of students is similar to that of the entire country; the average student household has seven persons which compares with an average of six for the whole country;[2/] and the students' family income appears close to

1/ The review included 202 trade and industry students and 155 agriculture students in project schools, 44 non-project trade and industry students and 39 students from the Vocational Teacher Training College at Thewes.

2/ For 1970.

the national average. About 90 percent of the parents of these final-year students had less than 10 years of formal schooling which supports the above conclusions. Eightyone percent of the students have their education financed by their parents--which imposes a heavy burden on the family income (para. 5.04). Despite its modesty, the home environment is conducive to successful school achievement and, by the standards of developing countries, the students have a relatively good access to radio and newspapers in their homes. Adverse factors which affect student performance in some developing countries, e.g., nutrition levels, electricity supply and travel to school did not appear to pose problems for project school students.

6.10 A comparison between the fathers' occupation and present students' vocational aspirations is shown below:

| | Agricultural Schools | | Trade and Industry Schools | |
|---|---|---|---|---|
| Occupation | Fathers' Occupation (%) | Students' Aspirations (%) | Fathers' Occupation (%) | Students' Aspirations (%) |
| Further Studies | - | 53 | - | 72 |
| Public Sector | 38 | 17 | 32 | 9 |
| Industry | 6 | - | 9 | 19 |
| Agriculture | 32 | 29 | 18 | - |
| of which: | | | | |
| Farmer | (32) | (15) | (18) | - |
| Other | 24 | 1 | 41 | - |
| TOTAL | 100 | 100 | 100 | 100 |

The most striking feature is the high percentage of students who indicate that they wish to pursue further studies upon graduation, both in the agricultural schools (53 percent), and in the trade and industry schools (72 percent). The total percentage of agricultural students who aspire to work in agriculture (29) is not significantly lower than the corresponding percentage of fathers' occupation (32). It appears, however, that training in agriculture does not motivate the students to take up actual farming and the percentage of students who aspire to be farmers (15) is less than one half the corresponding percentage of fathers' occupation (32). For the trade and industry students, the small percentage of students (19) planning to enter the industrial sector at the skilled worker level is also noteworthy since the main objective of the project schools is to train skilled workers although, of course, some proportion can be expected to transfer to diploma-level institutes for

technician training.[1/] A review of the employment of the graduates confirms the above findings.

6.11 The students' attitude to the school and the school subjects including science and technology is positive. They consider education as an efficient road to improved standards of living. Most feel that the quality and quantity of the theoretical studies and workshop activities are satisfactory, but 70 percent agree with the teachers that the amount of laboratory and field work is insufficient; one half complained also about insufficiency and under-utilization of field and laboratory equipment (para. 4.04).

Graduates

6.12 The annual output of project school graduates is close to the projections made at the time of appraisal:

| | Annual Number of Graduates | |
|---|---|---|
| | Appraisal Projections | Actual 1972 |
| Trade and Industry Schools | 2,110 | 2,154 |
| Thewes Teacher Training College | 250 | 149 |
| Agricultural Schools | 1,385 | 1,425 |
| Secondary level | (1,250) | (979) |
| Technical level | (135) | (446) |
| TOTAL | 3,745 | 3,728 |

The number of graduates of the Thewes Teacher Training College is 60 percent of the projected figure because the course has been extended from two to three years. The target of the agricultural schools has been met but the output at the secondary level is below the original estimate because of a conversion of four schools into post-secondary institutions, at which level the output has consequently increased (Annex 6). In total, 10,400 students have graduated from the 14 trade and industry project schools since 1967. Most students specialized in automechanics (22 percent) followed by electricity (19 percent), machine shop (17 percent), radio and telecommunications (16 percent), building construction (14 percent), and welding and sheet-metal (12 percent).

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1/ In Thailand, the technical institutes accept only graduates of the trade and industry schools.

6.13 The mission reviewed the employment of 20 percent of the graduates of the trade and industry project schools. The graph (Fig. 1) shows that unemployment is low[1], considering the youth of the graduates. It averages 7 percent for the period. In 1967, 76 percent of the graduates were employed and only 13 percent continued their studies. These percentages have changed considerably. In 1972, 57 percent were employed and 42 percent continued to further education.

6.14 The quality of the project schools is high. In consequence, the demand for places far exceeds the capacity. The average application--acceptance ratio for the trade and industry project schools visited by the mission was 4 to 1 in 1973, but is lower for the non-project schools[2]. As a result, entrance requirements are relatively high in the project schools and not only is the academic quality of accepted students high but their academic aspirations are also higher than in other schools. This affects the primary function of the schools, i.e., to supply the labor market with skilled workers.

6.15 A regional analysis of the data reveals differences in the employment opportunities. The percentage of graduates taking up employment in Chiengmai, the second largest city in the country, is consistently higher than in the other schools and has remained more or less constant since 1967. In Ubolrajthani over 70 percent of the graduates entered the labor market in 1967; by 1972 this percentage had fallen to 12 percent. No satisfactory explanation of the regional differences has been identified. An analysis of the employment by specialization shows a lower demand for machine shop, welding and sheet metal students (Annex 7). The Government would be well advised to review the employment in those areas and possibly reduce the student intake.

6.16 The mission also reviewed the employment of 50 percent of the agricultural project schools' graduates. As the graph (Fig. 2) shows the percentage of graduates who are unemployed after 12 months is low, averaging 4 percent during 1967-1972. The employment rate has shown only a slight tendency to decrease and has levelled off at 70 percent while 26 percent have continued to further studies. It should be noted, however, that the percentage of graduates taking up employment in activities not directly related to their training has increased from 14 percent to 44 percent.

6.17 In summary, there is no serious employment problem among the project school graduates but perhaps the number of industry and trade school graduates going to further education should be limited and the reason why an increasing number of agriculture school graduates enter jobs other than agriculture should be explored.

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1/ 12 months after graduation.

2/ It was 2:1 in the non-project school visited by the mission.

THAILAND - EDUCATION

PROJECT EVALUATION

(471-TH)

EMPLOYMENT OF TRADE AND INDUSTRY

PROJECT SCHOOL GRADUATES

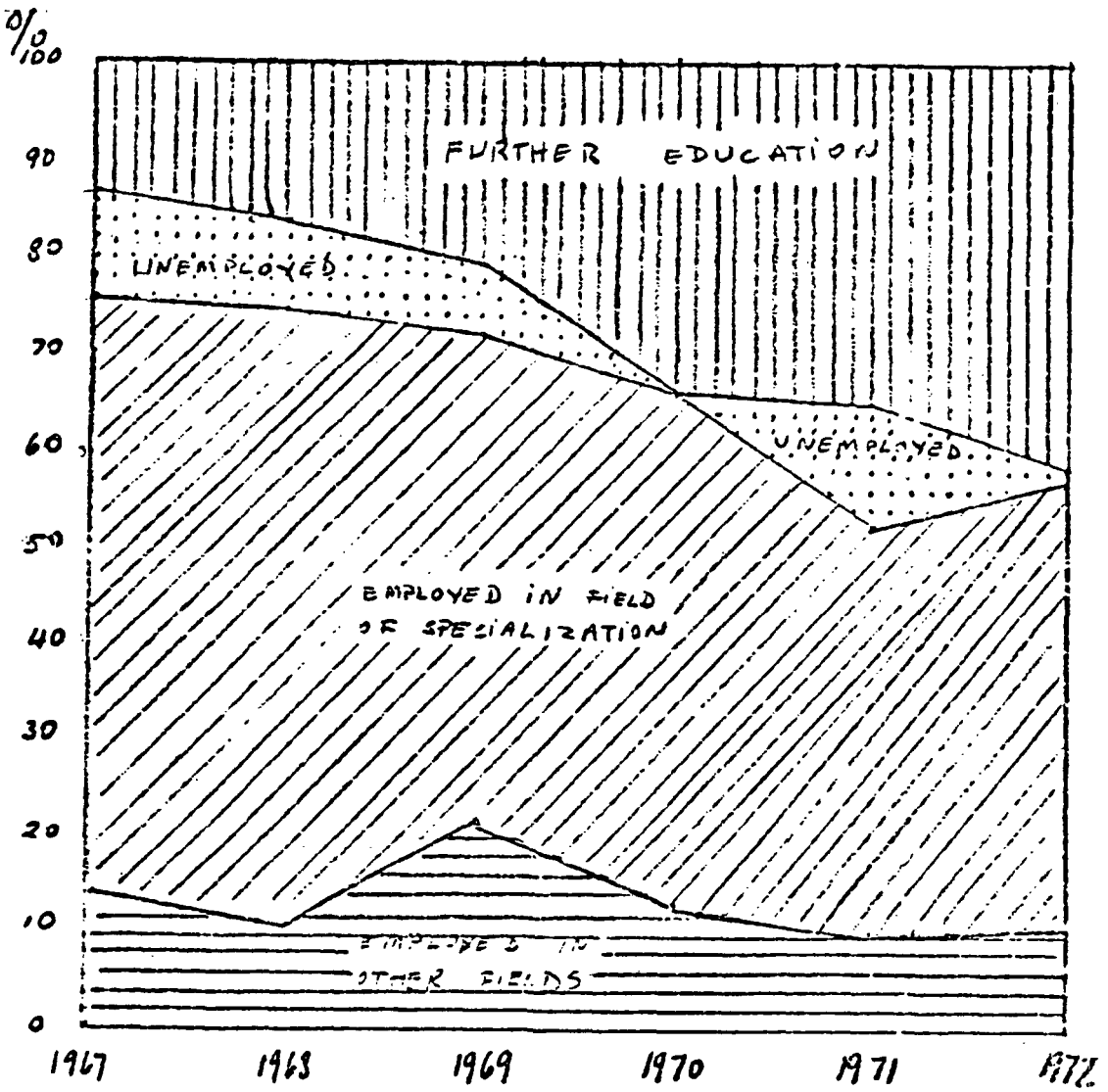


Fig. 1.

July. 1973

THAILAND - EDUCATION

PROJECT EVALUATION

(471-TH)

EMPLOYMENT OF AGRICULTURE

PROJECT SCHOOL GRADUATES

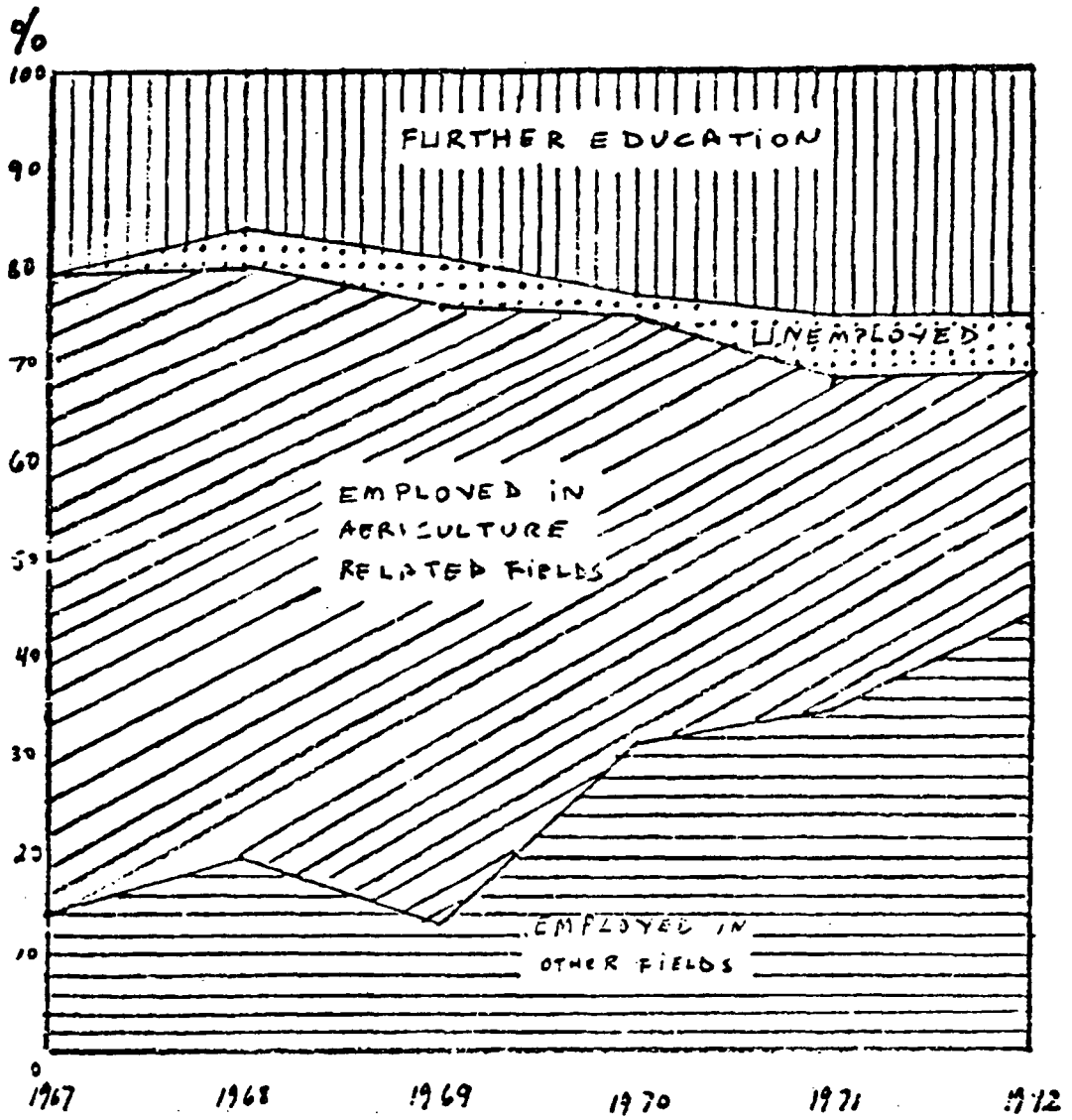


Fig. 2

## Organization and Management of the Borrower

### The Project Unit

7.01 The MOE was responsible for implementation of the project. A project unit was set up in DVE with a full-time project director with the rank of Deputy Director-General, an Executive Secretary, and adequate supporting staff. Architectural advice was given to the School Buildings Unit in DVE. The unit was assisted by a USAID team consisting of a project adviser, three technical specialists and a procurement adviser (referred to under Technical Assistance). Collaboration between the two groups appears to have been excellent and the project unit carried out its duties with success.

7.02 A particularly strong feature of implementation has been the Maintenance and Service Department of DVE, the establishment of which owes much to the project unit and its USAID collaborators. From a simple storage center, the MSD unit has grown to a large, well-staffed, well-equipped workshop where equipment for schools is received, tested, adjusted and repaired as necessary and then dispatched to the appropriate institution.

### School Administration

7.03 The high performance of the students and the overall good order of the project schools show efficient administration. It has been mentioned (para. 6.02) that the schools have no clerical staff and teachers perform many administrative duties. This is expensive but it distributes administrative responsibilities among a wide group of staff. The involvement of teachers in all aspects of the school life is beneficial to the institution. It was possible to obtain comprehensive statistical information during the school visits although the language problems hampered discussions. The principals generally know the school programs, facilities, staff and students but different standards in accounting made financial discussions difficult.

## Relations with Industry, Community and Central Authorities

7.04 During project implementation, local advisory committees, which include representatives of industry, were appointed to about half of the trade and industry project schools. However, these committees were less effective than expected in helping the schools to adapt the curricula to the conditions and requirements of local industry for two reasons: first, because of the small size of most local industries, few appointees could devote much time to the committees and second, because of the centralized control over school programs and curricula, little interest could be generated in the community. There are, however, other signs of cooperation with the community at the working level. Equipment repaired in the trade and industry schools comes from the local private sector and local industry in some areas provides "on-the-job" training to students. The agricultural schools conduct seminars for local farmers. Relations between the schools and the central authorities

are close. DVE helps the schools in obtaining spare parts for equipment and in buying books in Bangkok which cannot be found locally. The frequency of supervision of the schools by authorities of the MOE and DVE is adequate at about 1-2 times a year.

Bank Supervision

7.05 Eight Bank supervision missions were dispatched during five years. The missions inspected construction sites, held meetings with officials from various ministries, with the Japanese architectural firm, the US Project team and the Thai Project unit staff; and reviewed equipment procurement, the technical assistance and the teacher training of the project. Among important recommendations of the supervision mission which were adopted by the Thai Government include:

(a) a salary increase of US$15 equivalent[1/] per month to all instructors in project schools who completed courses of training;

(b) the establishment of a national "tracer" system on the employment of trade and industry, and agriculture schools graduates;

Problems Encountered During Project Implementation

7.06 The original closing date (June 30, 1970) has been extended four times to February 28, 1972; August 31, 1973; December 31, 1973; and May 13, 1974; largely due to problems encountered in procurement. Equipment lists were made with painstaking care. The participation of academic staff in bid evaluation was commendable but was one of the reasons for slowing down the awarding of contracts. For bidding purposes, equipment was divided in 24 packages and 590 contracts were signed.

7.07 A serious problem was the repair of equipment which was damaged during transport because of bad packing and rough treatment at the docks. US$1.1 million worth of equipment, i.e., 18 percent of total equipment purchases, arrived damaged. Some local agents, having received 90 percent of the cost of the equipment upon receipt by DVE of shipping documents, were unconcerned about the remaining 10 percent and dilatory in repairing damaged equipment or obtaining replacement parts. Upon the recommendation of the Bank, the paying of 90 percent of cost was discontinued and the agents were paid 40 percent upon receipt of shipping documents, the remaining 60 percent after receipt, inspection and equipment testing. The results were a much faster response and cooperation of suppliers, but fewer bids and slightly higher prices were observed.

7.08 A slow distribution of equipment to the project schools contributed also to the extension of the closing date. This was due to three causes: school workshops were not ready to receive equipment when it arrived at MSD; access roads to workshops were not complete or unusable for equipment; and the transport organization was unwilling to dispatch trucks to the project schools unless they were fully loaded.

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1/ This implies an approximate salary increase of 20%.

7.09 According to the Project Unit, the long interval between submission to the Bank and Bank approval of procurement documents also contributed to the extension of the Closing Date; the average number of days was 42. The average interval between dispatch and Bank approval for the first 12 bidding packages was 49 days compared with 34 days for the last 12 packages which reflects an improvement during the latter stages of the project[1/].

7.10 The procurement problems resulted in a slowing down of disbursements[2/]. At the original closing date, 48 percent of the loan had been disbursed while 79 percent had been disbursed at the first extension of the closing date. In total, 1,113 applications for disbursements have been made. This high number is due to the Borrower's practice of submitting to the Bank one application for each supplier's request for payment. The Bank's procedures allow for the inclusion of an unlimited number of such requests, as long as the currency of payment is the same, in each disbursement application and the procedure followed by DVE became unnecessarily cumbersome.

East Asia and Pacific Regional Office

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1/ These figures include the transit of airmailed documents (about 20 days) and the occasional unexplained dispatch of documents by surface mail, requiring up to 60 days from Bangkok to Washington.

2/ Annex 8 shows the actual schedule of disbursements compared with revised estimates made during project implementation.

# Education Project Loan 471-TH

## Completion Mission

## A Note on the Methodology Employed

1. The evaluation was carried out through a study of available data in the Department of Vocational Education (DOVE) of the Ministry of Education (MOE) and through visits to a sample of project schools. The sampling was made to assure significant representation in geographical location and in type of institution. The mission visited nine project schools, one non-project school and one vocational training mobile unit.[1/]

2. In the schools the mission reviewed physical facilities and equipment; followed lessons in classrooms, workshops and laboratories and conducted in-depth interviews with the principal and the administrative staff.

3. In each school, the mission conducted interviews with 20 teachers and with 50 students of the graduating class by means of anonymous questionnaires. The teachers were asked about training, workload, and teaching methods. The students' questionnaire was divided into two parts: the first dealt with the students' socio-economic background, vocational aspirations and school attitudes; the second part measured educational achievement.

4. Information on employment was obtained through a national "tracer"[2/] study and through questionnaires completed at the project schools.

5. This approach permitted:

   (a) a comparison between the appraisal report's implementation and cost estimates and the actual execution and cost of the project;

   (b) an evaluation of the fulfillment of the project objectives and an analysis of the students and graduates of the project schools and their employment.

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1/ The nine educational institutions visited were: Thewes Vocational Teachers College; Bang Pra Agricultural Teacher Training College; Trade and Industry Schools at Chiengmai, Samutprakarn, Phuket and Ubolrajthani; Agricultural Schools at Chiengmai, Nakornsithamaraj and Surin. The non-project institutions visited were the Trade and Industry School located at Minburi and the Vocational Training Mobile Unit located at Ubolrajthani.

2/ A "tracer" study provides information on employment and the time taken to enter employment after graduation from school.

**THAILAND - EDUCATION PROJECT EVALUATION**
**(471-TH)**

EXPENDITURES AND RECEIPTS OF SAMPLE OF VOCATIONAL SCHOOLS : 1972
(Thousand Baht)

| | Trade and Industry Schools | | | | Non - Project Trade & Industry | Thewes Teacher Training | Agricultural Schools | | | Bang Pra Agricultural |
|---|---|---|---|---|---|---|---|---|---|---|
| | Chiengmai | Phuket | Samut Prakarn | Ubolrajthani | Minburi | College | Chiengmai | Nakornsithamaraj | Surin | College |
| **EXPENDITURES** | | | | | | | | | | |
| SALARIES | 1,089.1 | 797.2 | 928.2 | 1,192.2 | 557.2 | 2,185.1 | 1,903.4 | 1,060.2 | 1,262.0 | 1,055.8 |
| Administrative | - | - | - | 94.6 | - | N.A | - | 40.4 | - | 15.8 |
| Teaching | 1,026.0 | 723.3 | 860.1 | 1,005.4 | 497.8 | N.A | 1,292.1 | 865.2 | 1,238.0 | 890.5 |
| Other | 63.1 | 73.9 | 68.1 | 92.2 | 59.4 | N.A | 611.3 | 154.6 | 24.0 | 149.5 |
| MATERIALS RELATED TO EDUCATION | 507.9 | 470.6 | 592.0 | 385.5 | 152.3 | 2,367.0 | 789.3 | 627.2 | 1,748.5 | 835.3 |
| Consumable Materials | 377.5 | 442.3 | 447.4 | 371.8 | - | 1,360.6 | 348.7 | 582.9 | 313.4 | 761.2 |
| Books | 11.9 | 6.6 | 6.7 | 6.0 | 3.8 | 121.4 | 19.4 | 12.9 | 115.9 | 29.0 |
| Equipment | 95.2 | 13.5 | 2.8 | - | | 285.5 | 305.5 | 31.4 | 1,023.6 | - |
| Other | 23.3 | 8.2 | 135.1 | 7.7 | 148.5 | 595.5 | 115.7 | - | 295.6 | 40.1 |
| MATERIALS NOT RELATED TO EDUCATION | 77.0 | 57.7 | 142.0 | 111.7 | 10.7 | 1,215.8 | 872.7 | 1,401.4 | 498.6 | 1,070.7 |
| Boarding | - | 5.5 | 15.8 | 39.2 | - | 270.9 | 605.1 | 984.3 | 23.8 | 701.1 |
| Transporation | 50.0 | 6.3 | 17.1 | 19.3 | 5.3 | 567.9 | 81.5 | 38.3 | 73.9 | 47.2 |
| Maintenance | - | 5.5 | 11.9 | 23.2 | - | 231.0 | 31.2 | - | 360.7 | 40.9 |
| Public Utilities | 27.0 | 40.4 | 97.2 | 30.0 | 5.4 | 146.0 | 154.9 | 378.8 | 40.2 | 281.5 |
| TOTAL EXPENDITURES | 1,674.0 | 1,325.5 | 1,662.2 | 1,689.4 | 720.2 | 5,767.9 | 3,565.4 | 3,088.8 | 3,509.1 | 2,961.8 |
| **RECEIPTS** | | | | | | | | | | |
| From Central Government | 1,543.6 | 1,356.0 | 1,502.5 | 1,587.1 | 711.1 | 5,472.8 | 2,703.6 | 1,642.2 | 2,010.0 | 1,882.4 |
| Local Authorities | - | - | - | - | - | - | - | - | - | - |
| Student Fees | 84.4 | 7.2 | 263.1 | 150.7 | 40.7 | 429.0 | 666.4 | 1,341.1 | 1,327.7 | 954.9 |
| Contributions | 23.3 | - | - | - | - | - | - | - | - | - |
| Other | 22.6 | 51.9 | 17.8 | 30.0 | - | 148.8 | 667.2 | 178.4 | 345.9 | 196.6 |
| TOTAL RECEIPTS | 1,674.2 | 1,415.1 | 1,783.4 | 1,767.8 | 751.8 | 6,050.6 | 4,037.2 | 3,161.7 | 3,683.6 | 3,033.9 |

Annex 2A

**THAILAND - EDUCATION PROJECT EVALUATION**
**(471-TH)**

EXPENDITURES AND RECEIPTS OF SAMPLE OF VOCATIONAL SCHOOLS : 1972
(Percent Distribution)

| | Trade and Industry Schools | | | | Non - Project Trade & Industry | Thewes Teacher Training | Agricultural Schools | | | Bang Pra Agricultural |
|---|---|---|---|---|---|---|---|---|---|---|
| | Chiengmai | Phuket | Samut Prakarn | Ubolrajthani | Minburi | College | Chiengmai | Nakornsithamaraj | Surin | College |
| EXPENDITURES | | | | | | | | | | |
| SALARIES | 65.1 | 60.1 | 55.9 | 70.6 | 77.4 | 37.9 | 53.4 | 34.3 | 36.0 | 35.6 |
| Administrative | - | - | - | 5.6 | - | N.A | - | 1.3 | - | 0.5 |
| Teaching | 61.3 | 54.5 | 51.8 | 59.5 | 69.2 | N.A | 36.3 | 28.0 | 35.3 | 30.1 |
| Other | 3.8 | 5.6 | 4.1 | 5.5 | 8.2 | N.A | 17.1 | 5.0 | 0.7 | 5.0 |
| MATERIALS RELATED TO EDUCATION | 30.3 | 35.5 | 35.6 | 22.8 | 21.1 | 41.0 | 22.1 | 20.3 | 49.8 | 28.2 |
| Consumable Materials | 22.5 | 33.4 | 26.9 | 22.0 | - | 23.7 | 9.8 | 18.9 | 8.9 | 25.8 |
| Books | 0.7 | 0.5 | 0.4 | 0.4 | 0.5 | 2.1 | 0.5 | 0.4 | 3.3 | 1.0 |
| Equipment | 5.7 | 1.0 | 0.2 | - | ) | 4.9 | 8.6 | 1.0 | 29.2 | - |
| Other | 1.4 | 0.6 | 8.1 | 0.4 | ) 20.6 | 10.3 | 3.2 | - | 8.4 | 1.4 |
| MATERIALS NOT RELATED TO EDUCATION | 4.6 | 4.4 | 8.5 | 6.6 | 1.5 | 21.1 | 24.5 | 45.4 | 14.2 | 36.2 |
| Boarding | - | 0.4 | 1.0 | 2.3 | - | 4.7 | 17.0 | 31.9 | 0.7 | 23.7 |
| Transportation | 3.0 | 0.5 | 1.0 | 1.1 | 0.7 | 9.9 | 2.3 | 1.2 | 2.1 | 1.6 |
| Maintenance | - | 0.4 | 0.7 | 1.4 | - | 4.0 | 0.9 | - | 10.3 | 1.4 |
| Public Utilities | 1.6 | 3.1 | 5.8 | 1.8 | 0.8 | 2.5 | 4.3 | 12.3 | 1.1 | 9.5 |
| TOTAL EXPENDITURES | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| RECEIPTS | | | | | | | | | | |
| From Central Government | 92.2 | 95.8 | 84.2 | 89.8 | 94.6 | 90.5 | 67.0 | 51.9 | 54.6 | 62.0 |
| Local Authorities | - | - | - | - | - | - | - | - | - | - |
| Student Fees | 5.0 | 0.5 | 14.8 | 8.5 | 5.4 | 7.1 | 16.5 | 42.4 | 36.0 | 31.5 |
| Contributions | 1.4 | - | - | - | - | - | - | - | - | - |
| Other | 1.4 | 3.7 | 1.0 | 1.7 | - | 2.4 | 16.5 | 5.6 | 9.4 | 6.5 |
| TOTAL RECEIPTS | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Annex 2B

# THAILAND - EDUCATION PROJECT EVALUATION
# (471-TH)

## Thawee' Book Production By Subject
## (Units)

| Subject | Number of Printings | Number of Textbook* |
|---|---|---|
| Building Construction | 8 | 4,900 |
| Auto Mechanics | 14 | 7,000 |
| Machine Shop | 4 | 5,000 |
| Welding and Sheet metal | 7 | 9,000 |
| Electricity | 7 | 14,000 |
| Radio and Telecommunications | 15 | 22,000 |
| Science | 5 | 16,500 |
| Mathematics | 6 | 12,500 |
| Thai | 6 | 16,000 |
| English | 3 | 10,500 |
| Social Studies | 4 | 7,000 |
| Drawing | 5 | 25,000 |
| General | 4 | 4,500 |
| TOTAL | 88 | 153,900 |

## Enrollment and Graduates From LIVE Project Schools

| INSTITUTION | ENROLLMENT | | | GRADUATES | | |
|---|---|---|---|---|---|---|
| | At Time of Appraisal | Proposed | Actual 1972 | At Time of Appraisal | Proposed | Actual 1972 |
| TRADE AND INDUSTRY SCHOOLS | 4,815 | 6,940 | 7,992 | 1,215 | 2,110 | 2,154 |
| North Bangkok | 530 | 710 | 832 | 150 | 220 | 244 |
| Prathumwan | 1,150 | 890 | 1,354 | 425 | 270 | 389 |
| Samut Prakarn | 65 | 445 | 472 | 10 | 135 | 130 |
| Yala | 75 | 445 | 420 | 5 | 135 | 111 |
| Hardyai | 350 | 445 | 403 | 60 | 135 | 88 |
| Phuket | 125 | 445 | 431 | 45 | 135 | 138 |
| Rajburi | 380 | 445 | 475 | 80 | 135 | 128 |
| Lopburi | 220 | 445 | 743 | 50 | 135 | 151 |
| Nakornsawan | 225 | 445 | 435 | 50 | 135 | 123 |
| Chienemai | 240 | 445 | 449 | 40 | 135 | 121 |
| Udornthani | 350 | 445 | 469 | 75 | 135 | 129 |
| Ubolrajthani | 365 | 445 | 605 | 55 | 135 | 182 |
| Nakornrajsima | 400 | 445 | 477 | 90 | 135 | 100 |
| Cholburi | 340 | 445 | 427 | 80 | 135 | 120 |
| THEWES TEACHER TRAINING COLLEGE | 280 | 550 | 528 | 140 | 250 | 149 |
| AGRICULTURAL SCHOOLS | 1,990 | 4,430 | 4,224 | 310 | 1,385 | 1,425 |
| UPPER SECONDARY LEVEL | 1,900 | 4,100 | 2,846 | 310 | 1,250 | 979 |
| Ayuthaya | 350 | 350 | 402 1/ | 80 | 110 | 133 1/ |
| Chiengmai | 580 | 600 | 285 | 140 | 175 | 153 |
| Nakornsithamaraj | 300 | 500 | 322 | 50 | 150 | 153 |
| Surin | 180 | 600 | 192 | - | 175 | 120 |
| Nan | 150 | 350 | 352 | 40 | 110 | 77 |
| Chumporn | 60 | 350 | 353 | - | 110 | 88 |
| Chantaburi | 60 | 350 | 253 | - | 110 | 59 |
| Pitsanuloke | 80 | 350 | 359 | - | 110 | 108 |
| Nakornpathon | - | 350 | 270 | - | 110 | 88 |
| Bang Pra | 140 | 300 | 58 | - | 90 | N.A |
| TECHNICIAN LEVEL | 90 | 330 | 1,378 | - | 135 | 446 |
| Chiengmai | 60 | 60 | 482 | - | 28 | 133 |
| Nakornsitharaj | - | 60 | 266 | - | 27 | 63 |
| Surin | - | 60 | 322 | - | 28 | 106 |
| Ayuthaya | - | 60 | N.A | - | 27 | N.A |
| Bang Pra | 30 | 90 | 308 | - | 25 | 144 |

1/ Includes graduates at the technical level.

THAILAND - EDUCATION PROJECT EVALUATION
(L71-TH)

## Employment Status of Trade and Industry Project School Graduates by Field of Specialization 1/

| | Auto-Mechanics | | Machine Shop | | Welding & Sheetmetal | | Electricity | | Radio & Tele-communications | | Building Construction | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Number of Graduates | 436 | - | 314 | - | 250 | - | 326 | - | 270 | - | 549 | - | 2145 | - |
| No Response | 108 | - | 104 | - | 81 | - | 107 | - | 91 | - | 132 | - | 623 | - |
| Number of Respondents | 328 | 100 | 210 | 100 | 169 | 100 | 219 | 100 | 179 | 100 | 417 | 100 | 1522 | 100 |
| Working | 225 | 69 | 113 | 54 | 101 | 60 | 164 | 75 | 122 | 69 | 277 | 66 | 1002 | 66 |
| Own Field | 200 | 61 | 83 | 40 | 64 | 38 | 140 | 64 | 88 | 49 | 226 | 54 | 801 | 52 |
| Other Field | 25 | 8 | 30 | 14 | 37 | 22 | 24 | 11 | 34 | 20 | 51 | 12 | 201 | 14 |
| Unemployed | 14 | 4 | 17 | 8 | 24 | 14 | 11 | 5 | 17 | 9 | 23 | 6 | 106 | 7 |
| Studying | 89 | 27 | 80 | 38 | 44 | 26 | 44 | 20 | 40 | 22 | 117 | 28 | 414 | 27 |

1/ Refers to the total number of graduates in a sample of 4 schools: (Chiengmai, Samut Prakarn, Phuket, and Ubolrajthani; representing about 20 percent of graduates of all Trade and Industry LIVE Project Schools during the 1967-1972 period.

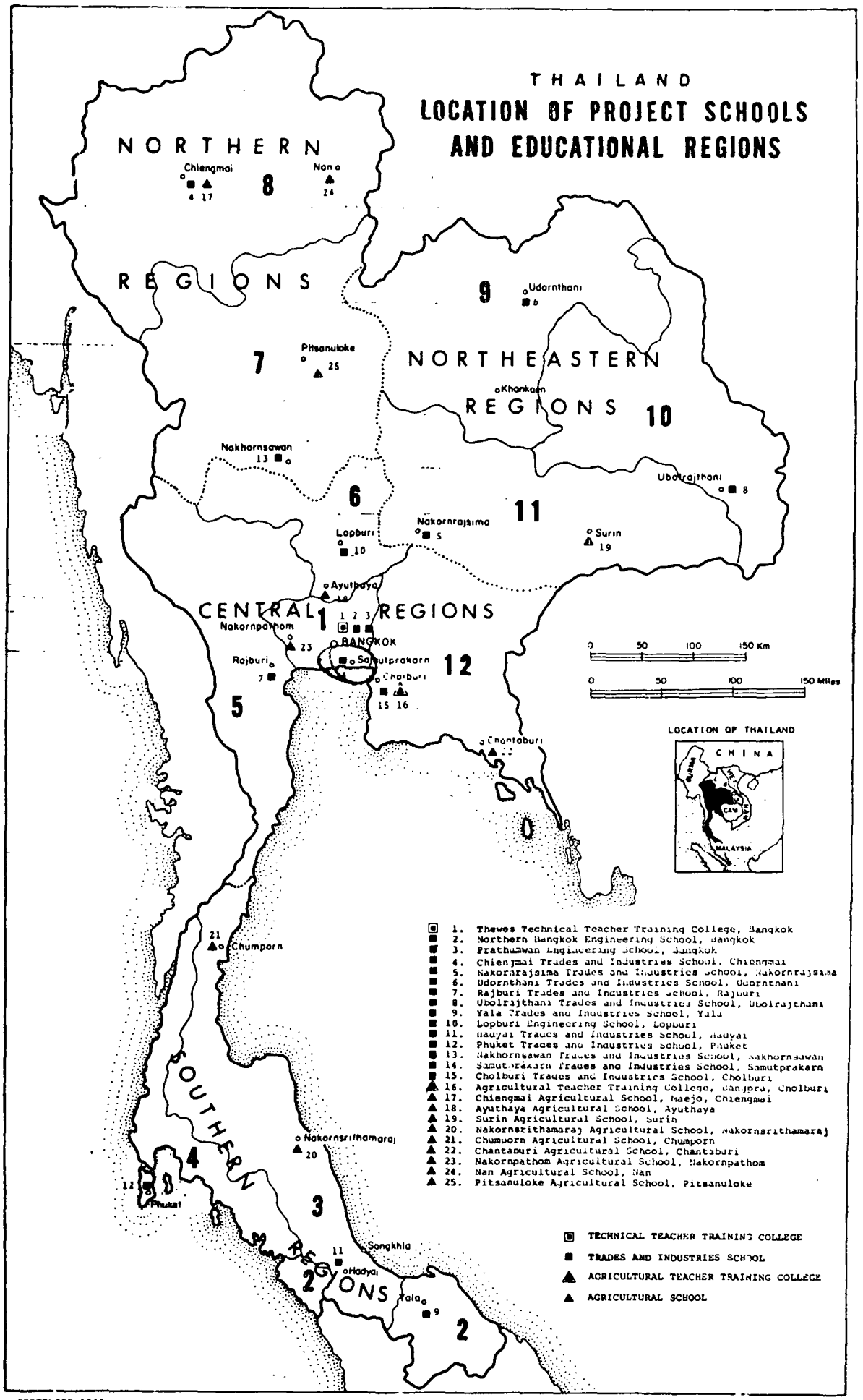
Annex 5.

THAILAND EDUCATION PROJECT EVALUATION

SCHEDULE OF DISBURSEMENTS

| IBRD FISCAL YEAR & QUARTER | ACCUMULATED DISBURSEMENTS IN THOUSAND US$ EQUIVALENT | | | | ACTUAL DISBURSEMENTS AS PERCENTAGE OF | | |
|---|---|---|---|---|---|---|---|
| | ACTUAL DISBURSEMENTS 1 | APPRAISAL ESTIMATE 2 | REVISED ESTIMATE 1/ 3 | REVISED ESTIMATE 2/ 4 | APPRAISAL ESTIMATE (5)=(1)÷(2) | REVISED ESTIMATE 1/ (6)=(1)÷(3) | REVISED ESTIMATE 2/ (7)=(1)÷(4) |
| 1966-67 | | | | | | | |
| I | | | | | | | |
| II | | | | | | | |
| III | | | | | | | |
| IV | - | 500.0 | | | % | | |
| 1967-68 | | | | | | | |
| I | | | | | | | |
| II | | | | | | | |
| III | | | | | | | |
| IV | - | 3,250.0 | | | % | | |
| 1968-69 | | | | | | | |
| I | | | | | | | |
| II | | | | | | | |
| III | 468.7 | | | | | | |
| IV | 649.0 | 5,500.0 | | | 11.8 | | |
| 1969-70 | | | | | | | |
| I | 1,542.3 | | | | | | |
| II | 1,816.9 | | | | | | |
| III | 2,289.1 | | | | | | |
| IV | 2,905.6 | 6,000.0 | | | 48.2 | | |
| 1970-71 | | | | | | | |
| I | 3,071.8 | | 3,305.6 | | 51.2 | 92.9 | |
| II | 3,380.2 | | 3,725.6 | | 56.3 | 90.7 | |
| III | 3,889.6 | | 4,165.6 | | 64.8 | 93.4 | |
| IV | 4,215.6 | | 4,615.6 | | 70.3 | 91.3 | |
| 1971-72 | | | | | | | |
| I | 4,444.9 | | 5,073.8 | | 74.1 | 87.6 | |
| II | 4,576.3 | | 5,672.0 | 4,600.0 | 76.3 | 80.7 | 99.5 |
| III | 4,745.0 | | 6,000.0 | 5,040.0 | 79.1 | 79.1 | 94.1 |
| IV | 5,099.7 | | | 5,430.0 | 85.0 | 85.0 | 93.9 |
| 1972-73 | | | | | | | |
| I | 5,343.9 | | | 5,725.0 | 89.1 | 89.1 | 93.3 |
| II | 5,482.3 | | | 5,915.0 | 91.4 | 91.4 | 92.7 |
| III | 5,797.6 | | | 5,975.0 | 96.6 | 96.6 | 97.0 |
| IV | n.a. | | | 6,000.0 | - | - | - |
| 1973-1974 | | | | | | | |
| IV | 5,905.0 3/ | | | | | | |
| | Closing date 6/30/70 | | 2/29/72 | 8/31/73 | | | |

1/ Disbursement estimates after extension of closing date to February 28, 1972
2/ Disbursement estimates after extension of closing date to August 31, 1973
3/ US$95,000 cancelled from loan account upon final disbursement, on May 13, 1974




SEPTEMBER 1966

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