

USAID/THAILAND FY 1986 COUNTRY DEVELOPMENT STRATEGY STATEMENT

SUPPLEMENTARY PAPER ON THE THAI AGRICULTURAL SECTOR

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I. INTRODUCTION

The purposes of this paper are to analyze Thailand's agricultural sector and to establish the basis for USAID's development assistance to Thailand during the second half of the 1980s. What follows is the Mission's analysis of (a) the role of agriculture in the Thai economy; (b) levels and allocation of agriculture development investment by government, foreign donors and the private sector; (c) potential sources of growth during the 1980's and early 1990's; (d) constraints to future agricultural growth, including policy and institutional failures; and (e) the role for USAID.

The Mission's conclusions are that: (1) Thailand's agriculture is funded beyond the public sector's current absorptive capacity, (2) there are limited opportunities for major AID assistance in agriculture given current Royal Thai Government (RTG) borrowing policies, (3) an agricultural growth rate of 4% is realistic and achievable at current rates of investment, and (4) USAID, though a minor donor, currently has and plans to continue an important role in supporting agriculture in Thailand, through activities directed primarily at policy reform and improvement of institutional capabilities.

II. ANALYSIS OF THAI AGRICULTURE ^{1/}

A. Importance of Agriculture to Overall Economy

Thailand's agricultural sector is one of the most dynamic in the world. Over the past two decades, agriculture has grown at an average annual rate of about 5%, while the Thai economy was growing at the even more impressive rate of 7-8% per annum in real terms. Thailand is one of the very few countries of the world which is a net food, feed and fiber exporter.

^{1/} Much of the analysis found in this paper is derived from a study prepared by Dr. Theodore Panayotou, Agricultural Development Council/Bangkok, under Purchase Order No. 498-0249-0-00-4015-00.

Thailand's agricultural exports include rice, rubber, corn, sugar, cassava, tobacco, sorghum, pineapple, mungbeans, fish and livestock products, and kenaf products.

Agriculture continues to dominate the Thai economy in terms of gross domestic product, employment and exports. In 1980, agriculture contributed about 26% of GDP, 58% of exports, and provided full or part-time employment for more than 70% of the country's labor force. Agriculture's relative contribution to the economy has been declining steadily as the country becomes more industrialized, while its absolute contribution continues to rise.

However, agricultural growth has slowed in recent years. Earlier rapid growth was achieved mostly through expansion of the cultivated area but as available new land diminishes, poorer marginal lands increasingly have come under cultivation and average yields, already low, have decreased. Low world and domestic commodity prices have accentuated the value growth decline, even though total production has continued to rise.

The RTG Fifth Five-Year Plan includes a target of 4.5% per annum growth in agriculture for the 1982-86 period, along with an overall economic growth target of 6.6% per annum. The RTG clearly expects agriculture to contribute to overall economic growth, export earnings, and to the alleviation of rural poverty.

B. Investment in Agricultural Development

1. Public Resources for Agricultural Development

a. Investment

Table 1. shows planned development expenditure by sector during the past four and the current fifth Five-Year Development Plans over the twenty-six year period from 1961 through 1986. The figures show

substantial increases in agricultural investment. Development expenditures in agriculture increased from under \$213 million during the First Plan (1961-66) to over \$5.3 billion during the Fifth Plan (1982-86). This is an increase in the share of agriculture in planned development expenditure from 13.5% during the First and Third Plans to 15.5% during the Fourth and Fifth. The rise from \$1.7 billion during the Fourth Plan (1977-81) to \$5.34 billion during the Fifth Plan (1982-86) is a 215% increase. These figures, while impressive, still underestimate actual investment in agriculture-- e.g., they do not include funds (\$174 million) during the Third Plan and (\$522 million) during the Fourth Plan which were not specified as agricultural but were in fact used for agriculture. Moreover, the Fifth Plan, unlike earlier plans, has earmarked \$1 billion for poverty alleviation and development in underdeveloped rural areas, a significant part of which is allocated for agricultural activities, namely, projects on food production for nutrition, upland rice production, soil improvement, Northeast saline soil development, agricultural credit for rural poor, and water resource development.

The importance of agriculture is also shown in annual budgets, e.g., the share of agriculture in the total government budget allocated to economic services rose from under 10% in the late sixties and early seventies to over 40% in the late seventies and early eighties (Table 2.). Agriculture's share of the total RTG budget ranged from about 2 percent to 9 percent during this period.

b. Sources of Public Funds

Public funds for development expenditures come from a number of sources which include the national budget, self-financed government agencies, local governments and foreign loans and grants. As shown in Table 3, of a total development budget of \$35 billion for the Fifth Plan, 67% was from the national budget, 17% from foreign loans, and 2% from foreign grants with the balance coming from self-financed government agencies (8%) and local governments (5%). Agriculture relies more heavily on the national budget (73%) and on foreign loans (22%) than all other

sectors combined, 65% and 16% respectively. The foreign grant component in agriculture (4%) is also larger than in other sectors (under 2%), while the contribution of self-financed government agencies is negligible and that of local governments non-existent. Rural development draws almost exclusively on the national budget except for 8% which comes from foreign loans (see Table 3.).

c. Allocation of Development Expenditure within Agriculture

The annual budget of the Ministry of Agriculture and Cooperatives (MOAC) grew from \$86.9 million in 1973 to \$608.6 million in 1983 (Table 4.). ^{1/} Between 55 and 60 percent of this budget was allocated to capital investment during 1975-1983. Of the nine departments and two offices of MOAC, the Royal Irrigation Department has absorbed about 63 percent of the Ministry's budget. Another 5.4 percent has gone to the Department of Agriculture and 8 percent to the Department of Agricultural Extension which are responsible for the development and dissemination, respectively, of new agricultural technologies. Two other agricultural-productivity related departments, the Department of Land Development and the Office of Agricultural Land Reform receive 5.7 percent of the budget, leaving about 17 percent for the Departments of Forestry (10%), Livestock (4%), and Fisheries (3%).

Table 5. shows the allocation of planned development expenditure to agriculture by development plan. The four productivity related expenditure areas, namely irrigation, research, extension and land development, have accounted for over 70 percent of the planned development expenditure in agriculture. During the Fourth Plan, for which detailed data are available, the development expenditure for irrigation was \$652 million, for land development \$521.7 million, for extension \$260.8 million and for research \$86.9 million.

^{1/} These figures exclude the budgets of the Permanent Secretary, Office of Agricultural Economics, and the Department of Cooperative Promotion.

2. Donor Assistance

Foreign grants to Thailand grew from around US\$30 million per annum in the early 1970s to over \$150 million in the early 1980s (Table 6). The share of agriculture in foreign grants grew from around 17 percent in the early 1970s to over 40% in the early 1980s.

Foreign assistance to agriculture in the form of loans grew steadily from under \$6 million in 1973 (or 5% of total foreign loans) to over \$250 million (or 12%) in 1982, a 40% increase (Table 7.). During the mid-1970s the share of agriculture in foreign loans was considerably higher because of a drop in borrowing for other sectors during 1975-76.

The two major donors in Thailand are the World Bank and the Government of Japan. Agriculture (and related rural development) are expected to use US\$1,330 million or 37% of the World Bank's total loan allocation to Thailand for 1982-86 (see Table 8.). 1983 figures for Japan show \$127.1 million or 32% of the total development assistance provided in support of agriculture.

Foreign-assisted agricultural projects for the period 1973-1988 are significant, amounting to \$3.82 billion (See Table 9.). Projects in agricultural research, training, crop improvement and vegetable, fruit and perennial crop development account for 44 percent or \$1.7 billion. This is followed by irrigation and energy projects with 33 percent or \$1.26 billion and extension and training with 7 percent or \$262 million. Another 7 percent is earmarked for land, forest, and watershed development and only 2 percent for rural development, agricultural credit, and agricultural processing combined. A list of 149 on-going and 18 planned foreign assisted agriculture projects can be found in Appendix I.

The Thai government, with assistance from foreign loans and grants, has been allocating to agricultural research \$22-35 million annually or 40-50% of the country's overall research budget (Table 10.). In 1980 the total RTG research budget was 1.4% of the total government budget and 0.22% of

GDP. The Fifth Plan has set a target to increase the ratio of the research budget to GDP to 0.5 percent, including the private sector. The Thai Government recognizes the importance of agricultural research and has committed substantial internal and external resources to it.

3. Private Sector Investments and Total Capital Stock

Despite the absorptive capacity constraints of the public sector which limited actual development expenditure in agriculture to 64% of the planned level during the Fourth Development Plan, capital formation in agriculture proceeded at a faster rate than during earlier plans because of the contribution of the private sector. The private sector accounted for about 70% of all capital formation in agriculture, even though capital market distortions and government policies discriminated against such investment in agriculture. The gross investment of the private and public sectors averaged \$282.6 million and the capital stock in agriculture reached \$3.8 billion in 1981, the last year of the Fourth Plan (see Table 11.). The average annual growth of the agricultural capital stock during the Fourth Plan was 5.6% which is 60% higher than the growth rate during the Third Plan (3.5%).

The capital stock embodies all net investments in Thai agriculture, whether private or public, domestic or foreign. Private foreign investment in developing country agriculture worldwide is usually very limited except in plantations, which do not exist in Thailand. Yet, in recent years Thai agriculture has received private capital inflows. For example, during 1980-82 Thailand received \$17.9 million of foreign private investment in agriculture compared to \$1 million during the preceding 3 year period (see Table 12.). While this is less than one percent of the total private capital inflow into Thailand, it is, nevertheless, indicative of the maturity of Thai agriculture and its healthy and highly-diversified sources of funds. Availability of local and foreign capital do not appear to be a constraints on agricultural growth and productivity improvement in Thailand.

C. Sources of Agricultural Growth during the 1980's and Early 1990's

If new agricultural land is nearly exhausted, then what are the likely sources of agricultural growth during the rest of the 1980s? This is a key question because of the important role of agriculture in the Thai economy as a source of employment, income, foreign exchange and growth linkages to other sectors.

The very factors which have constrained agricultural growth in the past, if corrected, hold the potential for being the most promising sources of agricultural growth in the future. Thailand, for example, has been among the slowest adopters of new technology in Asia. Consequently, there is considerable potential for increasing yields with existing technology and infrastructure given appropriate policy and institutional reforms, plus incentives. Specific opportunities are discussed below.

1. Improved Irrigation Efficiency and Expansion of Dry Season Cropping

There are substantial gains in yields and dry season cropping to be derived from improved maintenance and management of existing irrigation systems, especially in conjunction with increased use of unexploited yield-augmenting technology. Currently the total area of second and third crops is estimated at not more than 25 percent of the area under irrigation. Early investments in large scale irrigation projects have not yielded the planned returns because of low efficiency. This efficiency is partly explained by unfavorable output/input price relations; deficiencies in the design, maintenance and quality of government services; and limited land pressure except in the North to force farmers to efficiently utilize their land and irrigation facilities. A major donor agency estimates irrigation efficiency is as low as 15 percent. This suggests a potential for considerable expansion of the cropped irrigated area with available water.

2. Increased Security of Land Ownership

The Northern Agricultural Development Project (supported by the World Bank and the Australian Government) has shown that appropriate upland development measures can give substantial yield increases. If such investments are to be made by the farmers themselves, then secure land ownership is an essential prerequisite, both as an incentive and as a means for access to institutional credit. The RTG has recently initiated a land reclassification scheme under the IBRD Structural Adjustment Loan Program to provide farmers in already encroached forest areas with special use certificates (Sor Tor Kor) to establish their "right" to farm the land they now occupy illegally.

3. Increased Fertilizer Use

Large gains in yields can be expected from increased fertilizer use. This in turn can best be achieved by a reduction in the cost and improved marketing of fertilizers. Steps to be taken include (a) the promotion of competition among importers/wholesalers of fertilizers, (b) availability and promotion of low-cost (unsubsidized), single-nutrient fertilizers, (c) effective fertilizer quality control, and (d) improved water control. Based on farmer-field trials, it has been found that the use of cheaper (unsubsidized) sources of nitrogen, such as urea instead of mixed fertilizers such as ammonium phosphate currently in use, would more than double the value/cost ratio for rice, corn, sorghum, cassava, kenaf and cotton. With value/cost ratios between 2.5 and 5, compared to current ratios of about 1.5 or lower, a dramatic increase in fertilizer use and yield could be expected.

4. Lowering the Tax Burden of Agriculture

If in addition to lowering the cost of fertilizer and improving its quality, the government allows the prices of crops to rise to their competitive market levels, the value/cost ratio of using fertilizer and other

yield-augmenting inputs will increase further. For example, elimination of rice export taxes in 1981 would have increased the value/cost ratio of fertilizer by 60%, inducing additional fertilizer use. Domestic and trade restrictions which include price controls, export taxes, export premiums and quotas reduce farm prices and production incentives, especially for rice and rubber. Further relaxation of trade restrictions is likely to be the most efficient way of attaining the Government's objective of increasing production. The RTG recently began moving in this direction by lowering fertilizer prices, eliminating export quotas for corn and rice and reducing the export premium and duty on rice. Based on continuation of these policies, there is every reason to expect fertilizer use to increase and crop yields to rise in the years ahead.

5. Rehabilitation of the Resource Base of Agriculture

Another potential source of yield increases can be found in the rehabilitation and preservation of the resource base of agriculture through soil improvement, land development, irrigation system maintenance and, above all, watershed protection and management. Substantial funds are earmarked for saline and acid soil improvement and land development. The government has also shifted its emphasis and funds from the construction of large-scale irrigation structures to the maintenance and management of existing irrigation systems and to medium and small-scale irrigation in rainfed areas.

However, government efforts in the area of watershed rehabilitation, protection and management have been repeatedly frustrated by the continuing forest encroachment by illegal loggers and large numbers of landless squatters and marginal farmers who in the absence of better alternatives practice shifting cultivation. Deforestation in watershed areas has been partly responsible for recurring floods and droughts, soil erosion (4 million ha.) and sedimentation of irrigation systems.

To the extent that the Government succeeds in reducing shifting cultivation in critical watersheds, crop yields and total production are likely to rise, since the productivity of agriculture in these areas is extremely low. This will also help to increase productivity in downstream agriculture, since these areas are seriously affected by erosion. The Fifth Plan calls for a rehabilitation of 6.4 million hectares of watershed areas in the North and Northeast through planting of fast growing trees with the participation of local communities.

6. Increased Use of Idle Land and Crop Intensity

An additional source of agricultural growth during the rest of the 1980s will be new land and use of idle land as well as an increase in double cropping. The IBRD reports a trend (more pronounced in the Northeast) toward reduction of fallow area on paddyland (from 27% fallow in 1972-74 to 20% in 1976-78). This trend is expected to continue and to accelerate as a result of the limited land frontier and the improvement in price incentives and institutional arrangements (permanent land use permits).

7. Increased Availability of Improved Seed

The various sources of agricultural growth discussed thus far assume a modest increase in the use of existing high yielding varieties of seeds. The availability and distribution of improved seeds is substantially higher in the 1980s than in the 1970s due partly to USAID's support of the RTG's Seed Production Program. As a result, the RTG production of improved seed for six crops (rice, corn, sorghum, groundnut, soybean and mungbean) increased from 173 M.T. in 1976 to 3,225 M.T. in 1980. The RTG seed program has attracted support from other donors such as Japan and the EEC for additional corn and rice seed centers. More dramatic production increases in corn seed have been achieved by the private sector alone.

As part of the Fifth Plan the government has initiated a Seed Exchange Program under the Ministry of Agriculture with the objective to accelerate the replacement of low yielding native varieties with recommended improved varieties (\$7 million has been approved for the program); this program would be more successful if more high quality seed were available.

In addition to the public sector, the number of private companies engaged in the production, processing and distribution of seed, particularly for corn, sorghum and vegetables, is increasing. The continued rapid progress in production and distribution of seed in recent years is an additional source of future growth in yield especially in combination with increased fertilizer use and improved water management.

3. Modest Improvements in Crop Technology and Water Control in Rainfed Areas

Thus far, we have assumed relatively unchanged technologies and infrastructure in the sense of no major breakthroughs in agricultural research and no new large irrigation systems, just better utilization of existing technologies and infrastructure. This is a conservative assumption considering the large sums of development expenditures already earmarked for agriculture.

The recent shift in research emphasis from irrigated to rainfed areas also is likely to affect yields in the late 1980s. There is a need for additional research and extension to develop improved varieties for rainfed crops that will increase as well as stabilize yields. Such varieties should be drought and insect resistant and with short growing periods to permit increased cropping intensity.

Moreover, investment in water control and drainage in low-lying rainfed areas (as distinct from full-scale irrigation) promises a high return. Such investment does not necessarily imply a need for research and irrigation funds. What it implies is a need for additional shifts of

development resources and manpower away from the Central Plains toward rainfed areas, particularly in the Northeast. However, consideration must be given to the fact that three major crops of the Northeast, glutinous rice, cassava, and kenaf face price and income inelastic demand. Further expansion of these crops has and will result in a steep fall in their prices and a drop in farm income. Research should be directed towards traded or at least price and income elastic commodities.

9. Improved Marketing/Business Opportunities

Finding adequate markets at reasonable prices will be to a large extent a function of world market prices. However, based on past performance, and assuming Thailand will improve the quality and standards of exports, agricultural exports should continue to grow in volume even though non-farm exports will increase faster on a percentage basis. The Thai private sector and farmers are responsive to the market, and have sufficient resources to take advantage of market opportunities.

The RTG has recently taken steps to free up export marketing of most bulk commodities, and to provide sufficient credit at reasonable terms for exporters. This has been beneficial to farmers as well as traders. However, additional needed policy actions could be taken. These include improving and speeding up investment applications through the BOI and MOI, freeing up entry into business generally, removing remaining export taxes and other restrictions, eliminating pyramiding of foreigners' income taxes, strengthening out the visa system for investors, doing away with failing government enterprises that need protection, etc.

10. Summary of Growth Prospects

Several sources of agricultural growth have been identified and discussed above, many of which are now in operation and will continue to gather momentum during the rest of the 1980s and well into the 1990s.

Assuming minimum performance for the most likely of these growth sources, what is the projected rate of agricultural growth during the rest of the 1980s and early 1990s? Based on modest yield increases resulting from use of good quality improved seed, pesticides, relevant fertilizers and improved husbandry, and a projected planted area expansion of 1% per annum (down from 2.7% during 1975-89) the IBRD projects an annual growth rate for crops (GDP in constant prices) of 4.2% during 1981-86 and 4.3% during 1986-90. These rates are in line with Thai agriculture's historical performance and compare favorably with growth performance (3.3%) during the preceding period 1979-80. The annual growth rate of livestock is projected by the IBRD at 5% during 1981-86 and 5.2% during 1986-90 and the agricultural sector as a whole to grow at an average rate between 4.1 and 4.5% during the 1980s, which compares favorably with the 1970s (see Table 13).

Nonetheless, the agricultural goals of the Fifth Five-Year Plan, in all likelihood, are not going to be met. Most recent data show agricultural growth of 3.5% per annum, primarily because of low world commodity prices since 1982, and government policies which limit the use of yield-improving technology such as fertilizers, high quality seed, and biocides, thereby discouraging growth. A growth rate of 4% can yet be achieved during this Fifth Plan if world market prices improve, and if the RTG promptly acts to relieve constraints, uses existing resources more effectively, and encourages more investment by the private sector and individual farmers. The following section looks at major constraints to future growth.

III. CONSTRAINTS FACING THAI AGRICULTURAL DEVELOPMENT

A. Absorptive Capacity for Agricultural Projects

Agriculture has attracted and continues to attract increasing attention and funds from both the government and foreign donors. Productivity-augmenting activities such as irrigation, soil improvement, and research and extension receive the lion's share of the agricultural development budget. Agricultural research comprises 50% of the RTG's total research budget, or twice as high as agriculture's percentage contribution to GDP. This very success in attracting increasing amounts of funding for agriculture has resulted in a serious problem of absorptive capacity. The RTG is not able to effectively design, implement and evaluate the agricultural related projects now on the books. During the 1960s and the early 1970s the funding for agriculture was keeping pace with the absorptive capacity of the Ministry of Agriculture. However, as funding accelerated during the 1970s and the 1980s the Ministry found it increasingly difficult to design and implement a sufficient number of projects to absorb the entire development budget allocated to agriculture. As seen in Table 14., during the first two development plans (1961-1971) the actual development expenditure in agriculture amounted to 91% of the planned expenditure for the sector. While the average for the total economy is 85%, agriculture's absorptive capacity (defined as the ratio of actual to planned development expenditures) fell from 91% to 80% during the Third Plan (1972-76) and to 64% during the Fourth Plan (1977-81). That is, of the \$1.7 billion planned for agricultural development during 1977-81, only \$1.08 billion (or 64%) was expended by the end of 1981.

The absorptive capacity limits of the Ministry of Agriculture are due partly to the rapid growth of the annual development budget of the Ministry (from less than \$43.5 million to about \$1.1 billion within two decades) and partly because of institutional, administrative and personnel constraints. For example, in the Office of the Permanent Secretary of MOAC, which is responsible for the coordination of donor assisted agriculture projects, 30 percent of the authorized positions remain vacant (see

Table 15.)). Most severely understaffed are those divisions which are relevant to the handling of projects, i.e. finance division, projects division and the regional offices of the Ministry, particularly in the Northeast (34% understaffed) and the South (40% understaffed). The Department of Agriculture suffers from similar constraints.

The understaffing is perpetuated by a number of factors. Most important is a ceiling of 2% per annum on the growth in the number of government employees. There are particular shortages in rural areas, e.g., there are more Ph.D agricultural researchers at Khon Kaen University than in all of the Ministry's rural postings.

The MOAC is also seriously burdened by problems of coordination. Most agricultural activities and projects require inter-departmental cooperation; there are limited coordination mechanisms in place and the record for cooperation is poor.

In addition to these general problems, the 167 on-going and planned foreign-funded projects face special problems of their own. First, they are in competition with each other and with government projects for scarce RTG/MOAC resources, especially managers and high-grade technicians. When counterpart funds are required, there is competition for scarce financial resources. The procedures of the government and the donors for releasing funds to the field are usually ridden with delays, and foreign aid projects have limited access to start-up funds. Because of limitations on the size and quality of its staff, the Ministry is not able to participate sufficiently in the final design of projects. This, in turn, has often led to misunderstandings and a general breakdown in subsequent implementation. This is particularly serious when policy and institutional reforms are intended to be parts of agricultural projects. All of these problems become more difficult with loan projects, because of the RTG's perceived need to reduce borrowing and debt servicing restrictions.

R. Constraints to Productivity and Output Growth

Two important constraints which affect the ability of Thai agriculture to meet the country's growth goals are constraints on growth in productivity and constraints on growth in output. The former includes RTG price policies and minimal use of known technology designed to increase productivity. Examples of such policies are: (1) the export taxes on rice, rubber and sugar which fluctuate depending on world market prices and tend to keep farm gate prices below world market prices; (2) high fertilizer prices which tend to discourage use; and (3) regulations which discourage private sector slaughter houses. Policies to improve incentives for production are not sufficient to increase production to sustain yield improvement over time. Policy changes must be made to ensure that improved seed, fertilizer, pesticides, and other inputs are available and distributed.

With regard to constraints on growth in output, the following are key examples:

1. Available data show as much as 70% of the past growth in agricultural production has been accomplished through expansion of the cultivated area rather than through yield increases. These kinds of increases will not be possible in the future.

2. Fertilizer prices have been among the highest, and fertilizer use among the lowest, in Asia because of misguided government intervention, the oligopolistic structure of the central fertilizer market and the uneconomic compound fertilizers used.

3. The irrigated area is concentrated in the Central Plain and parts of the North, irrigation structures are poorly maintained and irrigation water, which is provided free of charge, is wastefully used limiting the effectively irrigated area.

4. Insecurity of ownership affecting over 50% of the agricultural land ^{1/} deprives some owners of both the means (credit) and the incentive to undertake the investments and purchase the inputs necessary for agricultural intensification.

5. As a consequence of relentless encroachment of watersheds and high slope lands, there have been increasing problems of floods, droughts and soil erosion which have depressing effects on yields in certain areas.

6. Last, but equally important, Thailand "has long pursued agricultural price policies and, more recently, industrial trade policies which sharply distort incentives against agriculture production in favor of capital intensive....manufacturing". ^{1/} The IBRD has estimated the direct income impact on farmers of rice taxation to be between \$365 million and \$630.4 million annually and of rubber taxation \$143.4 million and concluded that "these direct income effects of the pricing policies alone take out about as much or more from the rural areas as the combined rural development expenditures for agriculture and non-farm activities". ^{2/} Industrial trade policies also tax agriculture by increasing the prices of production inputs and consumer goods purchased from urban areas. Undoubtedly, a combination of low crop prices, high input prices, and high consumer goods prices (i.e., adverse terms of trade for agriculture) are potent disincentives for agricultural growth, unless it is attainable through inexpensive expansion of the cultivated area.

C. Summary of Constraints

The above analyses show that Thailand's agriculture is generously funded even beyond its current absorptive capacity and that the prospects for maintenance of historic growth rate throughout the 1980s appear good despite the approaching limits to crop land expansion.

^{1/} World Bank, "Thailand Programme and Policy Priorities for an Agriculture in Transition", Volume 1-4, December 3, 1982.

^{2/} Ibid.

The bulk of constraints are clearly in the policy realm. The country's low average yields are not a result of inadequate investment, since there has been substantial investment in irrigation and agricultural research and extension. Rather, they result from institutional failures (insecurity of land ownership, open-access forest land, unpriced irrigation water), market imperfections (fragmented capital markets, uncompetitive fertilizer market at the import/wholesale level), and most importantly, inappropriate government policies (export taxes, quotas, and industrial trade policies). Additional investment of funds in these areas would do little to increase yields unless (a) institutional and policy constraints are removed and (b) the absorptive capacity of the Ministry of Agriculture is enhanced to accommodate additional projects.

It should be pointed out that efforts are being made to enhance the absorptive capacity of the Ministry of Agriculture. Virtually all USAID projects have training and institutional strengthening components. Other donor activities emphasize similar objectives. For example, the National Agricultural Research Project (NARP) is a long-term (1981-1989) activity financed by the IBRD (US\$30 million), IFAD (US\$15 million) and Australia (US\$5 million). The objective is to strengthen the capability of the Department of Agriculture (DOA) to implement national research programs and develop relevant technology for extension through the reorganization and development of infrastructure and personnel within DOA. The National Research Council has also drafted a set of agricultural research policies for Thailand for 1982-86 to enhance the coordination of research agencies, the application of research findings and the production of technology transfer packages. The World Bank is also still planning a major Agricultural Support Services Project (\$47 million). Although this project has been stalled for the past year, NESDB is re-opening discussions with the Bank. If this project does come to fruition during the next year, it will have a major influence on the institutional capabilities of the MOAC.

The RTG, during the period of the Fifth Plan, has shown some willingness to remove institutional and policy constraints by reallocating existing resources away from large irrigation structures and research for the central region toward maintenance, rehabilitation, and management of existing structures and research directed at rainfed agriculture. A trend in this direction will be particularly beneficial to the more remote areas of Thailand which are disadvantaged by high transportation costs, information gaps, and uncertain agroclimatic conditions.

IV. ROLE FOR USAID IN THE AGRICULTURAL SECTOR OF THAILAND

In preparing its FY 1986 CDSS, the USAID Mission identified a number of premises which it felt were crucial to designing a new program strategy for Thailand--i.e., the Thailand of the 1980's, an emerging middle income country. These premises included:

- a change in the roles of government and the private sector with an increasingly greater reliance on the private sector as the determinant of sustained growth and development;
- a redirection from traditional subsistence concerns to a modernizing economy capable of achieving self-sustaining growth;
- increased support of the host government's own priorities and programs;
- recognition that the U.S. accounts for less than 3% of total ODA to Thailand;
- increasing dependence on loan funding;
- further reductions in Mission staffing levels.

On the basis of these premises and our analysis of Thai development problems and discussions with senior Thai officials, the Mission concluded that its strategic objective would be the establishment of a more collaborative relationship between the U.S. and Thailand in the area of development cooperation. This relationship would acknowledge Thailand's position as an emerging middle-income country and would go beyond the traditional donor-client relationship. The principal elements of the USAID strategy are:

- to concentrate resources in an area of high RTG priority and take advantage of AID's unique opportunities to have a positive impact on Thai policies and institutions;
- to convert the AID program from a mixed loan/grant to a substantially loan-financed set of activities;
- to reduce USAID staff and modify the Mission's structure in order to allow for greater analytical capacity; and
- to build the type of mature partnership which offers the greatest prospect of strengthening technical, intellectual, political and economic cooperation between the two countries, looking ahead to the day when relationships with Thailand will continue independently of concessional U.S. assistance programs.

More specifically, in its CDSS the Mission proposed that it would concentrate its FY 86-90 lending program in one broad development area: rural employment and rural industrialization. This would be complemented by \$4-5 million of grant funds per year for the Emerging Problems of Development Project and \$1 million for the PVO Co-financing Project.

One question automatically arises: What about agriculture? Our analyses for the CDSS and later for this paper identified a number of constraints to further growth of agriculture in Thailand and clearly pointed out the need for

productivity improvements. The analyses, however, also show that the prospects for growth and the maintenance of historic growth rates throughout the 1980's appear good to excellent despite the approaching limits to crop land expansion. They also show that the major impediments to growth and intensification of agriculture are of a policy, institutional, and economic, not necessarily technological, nature. ||

The RTG clearly [?] recognizes the need to deal with the full range of these constraints. Policy reforms are being made--e.g., permitting private sector livestock slaughter and reduction of rice export taxes. Substantial investment is being directed toward high-quality seed and fertilizer production and distribution. Efforts are being made to address the insecurity of land ownership by issuing special land use certificates thereby providing the incentive and a means to obtain institutional credit. A /

The RTG is also increasingly trying to deal with the institutional problems, particularly the absorptive capacity of the Ministry. Nonetheless, it is quite clear that the Ministry's absorptive capacity has already been exceeded and that this is not likely to be reversed in the short-term. This is the key reason for the NESDB's decision not to request further direct U.S. assistance (beyond that already planned) in this sector. Rather, NESDB and other key policy makers want the Ministry to consolidate its position, moving slowly forward with moderate foreign assistance in the sector. This is particularly true for loan financing since current government policy is to restrict severely its public borrowing, especially for technical assistance and training (the largest components of most USAID projects).

Notwithstanding the shift in focus for new commitments during the FY 1986 CDSS period, USAID plans no withdrawal from its traditional interest in agriculture in Thailand.

USAID has had a wide and varied portfolio in agriculture and currently is providing substantial support to the RTG's research, extension, inputs, and area development efforts. Our current portfolio consists of eight (8) projects valued at \$57.3 million, is described below.

<u>On-Going Projects</u>	<u>Million Dollars</u>
Agricultural Planning (493-0317)	3.2
Khon Kaen Research Development (493-0332)	2.0
Lam Nam Oon Integrated Rural Development (493-0272)	4.5
Land Settlements (493-0280)	4.2
Mae Chaem Watershed Development (493-0294)	10.0
Northeast Rainfed Agricultural Development (493-0308)	10.0
Northeast Small-Scale Irrigation (493-0312)	8.5
Seed Development II (493-0326)	<u>6.1</u>
Total	57.3

The Agricultural Planning Project is a 5-year program with the purpose of strengthening the capability of the Office of Agricultural Economics (OAE) within the Ministry of Agriculture and Cooperatives to carry out policy analysis, problem identification and analysis, planning, data collection and management, and integrated project preparation functions. The project includes technical assistance and off-shore training to strengthen and broaden OAE's project preparation, evaluation, and implementation capabilities. The project is scheduled to end in October 1985.

The purpose of the Khon Kaen University (KKU) Research Development Project is to strengthen the institutional capability of KKU to conduct agricultural research appropriate to Northeast rural communities. The project, a six-year effort which ends in June 1989, provides foreign exchange and local currency support to conduct research and strengthen the capability of the Research Development Institute and KKU's academic facilities to do such research. Funds are being used to finance research operations, short-term technical assistance, training workshops, and short-term training for KKU research personnel. Particular emphasis is being placed on farming systems research. The project also complements the Japanese Northeast Agriculture Development Project which is supporting RTG agronomic and soils research.

The Lam Nam Oon Integrated Rural Development Project focuses on increasing dry season agriculture production through improved irrigation related agricultural practices. The project, which ends in September 1985, includes funds for the completion and maintenance of existing irrigation systems, operation of on-farm water systems while integrating community development, agricultural research and extension, and marketing services. Particular emphasis has been placed on farming systems research and extension.

The primary purpose of the Land Settlements Project is to enable small farmers in eight (8) targetted settlements to make maximum effective use of their land through techniques that can be readily replicated throughout the Northeast. The project seeks to relieve key agricultural constraints by providing access to inputs (water, fertilizer, seed, credit, technology), access to markets, and by helping beneficiaries plan the best uses of available resources. Besides providing these elements, the Project assists in the research and evaluation of appropriate techniques for future efforts aimed at improving land use in Northeast Thailand. This project which is scheduled to end in December 1984 will, in all likelihood, be extended an additional six months.

The Mae Chaem Watershed Development Project is located in Northern Thailand and directed at improving real incomes while providing access to social services for rural household within the watershed. Reversing the deterioration in environmental quality is also a purpose of this project. A principal avenue to achieving this objective is through the development, enrichment, and use of land for agricultural purposes in environmentally sound ways. One major objective is to achieve rice self-sufficiency in the project area. This project is scheduled to terminate in June 1987.

The Northeast Rainfed Agricultural Development Project, a 7-year project ending in August 1988, seeks to use the management potential of the Northeast regional Office of Agriculture and Cooperatives to direct activities of various line departments in a systematic, integrated approach to agricultural

development in 9 Tambons distributed throughout the Northeast region. Emphasis is on local level research and extension activities, development of supplemental water resources, training, and applied (farming system) research and development, with a strong monitoring and evaluation component.

The purpose of the Northeast Small-Scale Irrigation Project is to establish a replicable approach and institutional capabilities for increasing agricultural incomes for small farmers within command areas of existing tank irrigation systems in Northeast Thailand. The Project, which is scheduled to terminate in October 1986, includes improvement of deteriorated embankments; the rehabilitation, extension and improvement of main canal systems; improved access roads; design and construction of effective on-farm distribution systems, land development; the provision of assistance to farmers in water management and agricultural practices; assistance for water user groups; marketing linkages and support; improved operation and maintenance programs; operational research and demonstrations; and the development of training programs for farmers and RTG personnel.

USAID's final on-going activity in the agriculture sector is the Seed Development II Project which is helping to establish an efficient RTG seed program that cost-effectively increases farmer use of high quality seed while steadily increasing the role of the private seed sector. This four-year project, scheduled to terminate in June 1987, follows an earlier 5-year project which established four RTG processing plants and strengthened the Seed Division's capacity to produce high quality seed. This project which began in 1982 supports a wide range of management upgrading activities, long term academic training in the U.S., the creation of a seed promotion and marketing section within the Department of Agricultural Extension's Seed Division, establishment of a vegetable seed center and the purchase of \$2.3 million in equipment. By the end of this, and complementary Japanese and EEC projects, the Seed Division will have 22 processing plants, meeting a large share of the country's needs in rice, corn, sorghum, peanut, mungbean, sorghum and various vegetable seeds.

Three major projects which involve AID support for agriculture are planned for FY 84 and FY 85.

<u>Planned Projects</u>	<u>Million Dollars</u>
Agricultural Technology Transfer (493-0337) FY 84	5.0
Emerging Problems of Development II (493-0341) FY 85	18.0 ^{1/}
Science and Technology (493-0340) FY 85	40.0 ^{1/}

The first is a \$5 million Agricultural Technology Transfer Project to accelerate the Ministry of Agriculture's capacity to identify, introduce and manage agricultural technology. This five-year project is comprised of three major components:

- Transfer and Adoption of Technology through the provision of research funds and modest schemes for modern appropriate technology. It is expected that much of the technology will be transferred from the U.S.A. through the use of consultants, scientific and technical skills upgrading, refresher training, and provision of scientific and operations equipment;
- Management Skills Improvement through various training modes to upgrade administration of research, extension and other important MOAC functions relating to the transfer of technology; and
- Strengthening of Public/Private Sector Collaboration through implementation of pre-feasibility assessments, technical seminars and workshops, and direct steps to overcome existing constraints to agri-business and the adoption of modern technology by Thai farmers.

^{1/} Tentative planning levels, both are expected to have substantial agriculture components

The second is the \$18 million grant Emerging Problem of Development II Project which will provide timely funding to facilitate policy dialogue, promote policy studies, support development seminars, and help meet technical assistance and training needs directed toward resolution of crucial development problems. This project will be active throughout the CDSS period. A substantial share of resources are planned to be allocated for support agricultural development issues. We expect most to be used for special agriculture policy studies and seminars, agricultural consulting services, and training. Funds may also be used for coastal resources management, soil/water management, and watershed management--all of which are important issues of the future. Management training in all areas of agriculture will also be encouraged.

Lastly, a \$40-60 million Science and Technology Program is being developed. This program will be problem oriented and a large portion of resources will be earmarked for agricultural research support and training, transfer and adaption of agricultural technology, and related agricultural activities. Although still in the initial design stages, the S&T Project is expected to include special designated research in the following agricultural areas: yield improvements, improvement in dairy animal health, reduction of fish/aquaculture diseases, and cassava utilization. The supported research will be done by Kasetsart University, as well as the three regional universities at Khon Kaen, Chiang Mai, and Hat Yai, in collaboration with Ministry of Agriculture researchers. As part of this research and research management effort, USAID is considering the establishment of a JCC position to assist in establishing and institutionalizing professional exchange.

AID, through 32 centrally-funded projects, is also making additional contributions to Thailand's agriculture development and research efforts. ^{1/} They include the following activities: exchange of genetic materials, peanut production and utilization research, technical assistance

^{1/} Appendix I provides a listing of centrally-funded activities currently supporting Thai agriculture.

directed at aflatoxin problems in corn and peanuts, post harvest technology, soil management and research support, technical assistance directed at farm level irrigation problems, research in aquaculture; collaborative research, training and extension on biological nitrogen fixation, research on aquatic weed problems, industrial extension of small-scale agricultural machinery, applied research on small-scale irrigation, agroclimatic research, and mineral studies with ruminant animals. This support is to both the Ministry of Agriculture and the University community.

V. CONCLUSION

The Bureau for Asia's 1983 Regional Strategic Plan looks to a fundamental realignment of resources and new concepts for future program design. For the more rapidly progressing countries in Asia (Indonesia, Philippines, Thailand), the Regional Strategic Plan envisions new country development assistance programs which:

- free up Southeast Asian staff resources for South Asian programs;
- graduate from the traditionally organized and conceived DA programs;
- concentrate increasingly on activities where the U.S. has a unique expertise or interest or in which the host government has demonstrated a strong interest in obtaining U.S. technical assistance to further its development objectives;
- facilitate long-term relationships between U.S. and Southeast Asian Institutions in both the private and public sectors; and
- rely on host governments to borrow A.I.D. funds to facilitate long-term institutional and scientific relationships.

The Mission endorses these strategic objectives and has built upon them in formulating its future program strategy. USAID will continue to support agriculture in Thailand, but at the same time move towards a relationship which recognizes Thailand's emerging middle-income status and focuses on development problems which the RTG most wants U.S. assistance in solving. During the CDSS period:

- USAID continues to implement a large portfolio of agricultural projects with resources in excess of \$57 million. These activities will continue into the late 1980s;
- USAID plans additional support for agriculture, which will focus on policy and management issues through (1) the Agricultural Technology Transfer Project (\$5 million for a six-year period); (2) Emerging Problems of Development II (\$18 million over a five year period), and (3) a Science and Technology Program (\$40 million for a five-year period);
- USAID plans to draw heavily upon centrally-funded agriculture projects, especially in promoting Thai research linkages to U.S. institutions. Grant funds from the EPD II Project will be used to facilitate "buy-ins" as needed;
- USAID expects its investments in rural industrialization to have substantial backward linkages to agriculture. By providing new markets, we indirectly expect to encourage increased agricultural production. USAID will also encourage increased PRE direct lending in agriculture-related opportunities, either to commercial banks or agricultural firms with linkages to small farmers; and
- USAID will monitor the agricultural situation on a continuing basis. If crucial needs and/or special opportunities arise, we will consider ways in which we can provide direct support to the RTG.

TABLE 1 Planned development expenditure^a during First, Second, Third Fourth and Fifth National Economic and Social Development Plan by sector. 1/

(million baht)

Sector	First Plan (1961-66)	Second Plan (1967-71)	Third Plan (1972-76)	Fourth Plan (1977-81)	Fifth Plan (1982-86)
1. Agriculture & Cooperatives	4,622	10,645	13,965	39,100	122,630
2. Industry Mining & Commerce	2,563	1,277	2,350	3,605	20,070
3. Transportation & Communication	10,230	17,393	19,745	37,175	117,520
4. Energy	4,329	6,084	7,875	15,950	102,360
Sub Total	21,744	35,398	43,395	95,830	362,580
5. Public Welfare & Community Development	1,154	1,659	2,700	8,620	22,560
6. Public Facilities	4,344	6,099	14,930	33,335	94,110
7. Public Health	3,178	2,290	6,340	19,380	56,280
8. Education	2,491	6,387	32,910	95,285	237,610
9. Others	1,560	3,876	-	-	2,210
10. Rural Development	-	-	-	-	23,990
Grand Total	<u>34,471</u>	<u>55,712</u>	<u>100,275</u>	<u>252,450</u>	<u>799,340</u>

^a From all sources: Central government, local government, foreign loans, and foreign grants.

Source: National Economic and Social Development Board, Division of Economic and Fiscal Planning "Unpublished Data Sheets".

1/ This table was prepared by Dr. Theodore Panayotou, ADC/Bangkok, under USAID Purchase Order No. 498-0249-0-00-4015-00.

Note: Baht/dollar conversion rate B23 = \$1.

TABLE 2: Total budget expenditure of RTG for Economic Services and Ministry of Agriculture and Cooperatives

(million baht)

Year	Total budget expenditures	Allocated to economic services		Allocated to Ministry of Agriculture and Cooperatives		
		amount	as % of total	amount	as % of economic services	as % of total expenditure
1967	19,239.2	5,791.0	30.1	490.6	8.5	2.6
1968	21,249.3	6,247.3	29.4	583.7	9.3	2.7
1969	23,929.4	6,843.8	28.6	637.9	9.3	2.7
1970	27,324.7	7,869.5	28.8	643.3	8.2	2.3
1971	28,598.5	7,664.4	26.8	671.5	9.8	2.2
1972	28,987.2	6,580.2	22.7	647.7	9.8	2.2
1973	30,603.2	6,793.9	22.2	-2,384.9	35.1	7.8
1974	39,081.3	7,503.6	19.2	-2,847.8	0.4	7.3
1975	50,457.9	12,715.4	25.2	4,258.4	33.5	8.4
1976	62,670.4	12,722.1	20.3	5,451.9	42.9	8.7
1977	68,790.1	14,583.5	21.2	6,805.2	46.7	9.9
1978	80,786.9	16,076.6	19.9	7,008.8	43.6	8.7
1979	92,152.3	17,785.4	19.3	7,691.8	43.2	8.3
1980	114,743.3	24,096.1	21.0	9,431.6	39.1	8.2
1981	140,102.2	31,943.3	22.8	11,926.1	37.3	8.5
1982	161,063.7	32,857.0	20.4	13,587.0	41.4	8.4
1983	177,326.7	33,869.4	19.1	15,131.3	44.7	8.5

Source: Bureau of Budget

Note: Baht/dollar conversion B23 = \$1.

TABLE 3: Planned development expenditure^{1/} for the Fifth Plan period (1982-1986)
classified by source of funds 1/

(million baht)

	National Budget	Self- financed government agencies	Local government	Foreign loans	Foreign grants	Total
Agriculture & Cooperatives	89,940	2,500	-	27,070	5,120	122,630
Industry & Mining	4,800	3,980	-	6,770	260	15,810
Commerce	3,730	530	-	-	-	4,260
Transportation & Communication	68,750	21,430	-	27,210	130	117,520
Energy	10,660	34,360	-	56,580	760	102,360
Sub-total for economic services	175,880	62,800	-	117,630	6,270	362,580
Public Welfare & Community	20,250	110	-	-	2,200	22,560
Public Facilities	29,310	2,790	50,640	11,370	-	94,110
Public Health	52,760	-	-	1,760	1,760	56,280
Education	232,700	-	-	2,710	2,200	237,610
Sub-total for social science	335,020	2,900	50,640	15,840	6,160	410,560
Rural Development	22,100	-	-	1,890	-	23,990
Other	-	-	-	-	2,210	2,210
Total development budget	533,000	65,700	50,640	135,360	14,640	799,340

- Figures not available

Source: NESDB, Division of Economic and Fiscal Planning, unpublished data.

^{1/} This table was prepared by Dr. Theodore Panayotou, ADC/Bangkok, under
USAID Purchase Order No. 498-0249-0-00-4015-00.

Note: Baht/dollar conversion rate B23 = \$1.

TABLE 4: The annual budget of Ministry of Agriculture and Cooperatives and its allocation to selected Departments (in million baht). 1/

Year	Total Budget ^a	Capital investment		Department of							
		amount	% total	Irrigation	Agriculture	Fisheries	Livestock	amount	% total	amount	% total
				amount	as % total	amount	as % total	amount	as % total	amount	as % total
1973	2,169.4	1,018.0	46.9	1,393.8	64.2	173.8	8.0	68.5	3.2	118.4	5.5
1974	2,566.4	1,311.0	51.0	1,694.4	66.0	189.4	7.4	82.8	3.2	123.6	4.8
1975	3,667.0	2,205.0	60.1	2,415.5	65.9	271.2	7.4	137.7	3.8	177.0	4.8
1976	4,838.8	2,990.0	61.8	3,202.3	66.4	318.1	6.6	177.5	3.7	210.5	4.4
1977	5,878.0	3,282.0	55.9	3,467.5	59.0	342.9	5.8	174.0	3.0	264.6	4.5
1978	6,308.5	3,453.0	54.9	3,855.7	61.1	352.2	5.6	190.1	3.0	286.1	4.5
1979	7,026.5	3,904.0	55.6	4,481.5	63.8	379.1	5.4	215.8	3.1	294.1	4.2
1980	8,707.0	4,955.0	56.8	5,376.5	61.7	432.5	5.0	243.3	2.8	360.1	4.1
1981	10,990.8	6,507.0	59.2	7,165.1	65.2	515.4	4.7	300.4	2.7	438.5	4.0
1982	12,598.0	7,411.0	58.8	8,165.3	64.8	583.4	4.6	371.0	2.9	501.1	4.0
1983	13,920.3	7,737.0	55.8	8,646.6	62.1	719.8	5.2	532.9	3.8	615.7	4.4
TOTAL	78,670.7	44,773.0	56.9	49,874.2	63.4	4,277.8	5.4	2,494.0	3.2	3,389.7	4.3

Note: Baht/dollar conversion rate B23 = \$1.

a. Budget does not include the Office of the Undersecretary, the Office of Agricultural Economics and the Departments of Cooperative Auditing and Cooperative Promotion.

b. Figures include the expenditure of structure, land & building and material.

1/ This table was prepared by Dr. Theodore Panayotou, ADC/Bangkok, under USAID Purchase Order NO. 498-0249-0-00-4015-00.

TABLE 4 (continued)

Year	Department of			Office of Ag. Land Reform amount as % total
	Forestry amount as % total	Ag. Extension amount as % total	Land Develop. amount as % total	
1973	200.8 9.3	143.5 6.6	70.6 3.3	- -
1974	237.0 9.2	157.0 6.1	82.2 3.2	- -
1975	331.2 9.0	231.7 6.3	102.7 2.8	- -
1976	454.2 9.4	278.8 5.8	141.6 2.9	45.8 0.9
1977	529.3 9.0	402.3 6.8	155.0 2.6	542.4 9.2
1978	684.9 10.9	480.3 7.6	164.5 2.6	294.7 4.7
1979	729.6 10.4	536.6 7.6	199.2 2.8	190.6 2.7
1980	1,075.3 12.4	743.8 8.5	274.5 3.2	201.0 2.3
1981	1,095.1 10.0	917.4 8.3	326.3 3.0	232.6 2.1
1982	1,269.2 10.1	1,020.4 8.1	391.1 3.1	296.5 2.4
1983	1,381.8 9.9	1,215.8 8.7	454.1 3.3	353.6 2.5
Total	<u>7,988.4</u> 10.2	<u>6,127.6</u> 7.8	<u>2,361.8</u> 3.0	<u>2,157.2</u> 2.7

Note: Baht/dollar conversion rate P23 = \$1.

TABLE 5: Composition of planned development expenditures to agriculture
(million baht)

Subject	First Second Phase '64-'66*	Second Plan '67-'71*	Third Plan '72-'76*	Fourth Plan '77-'81*
Research on Rice and Other Crops	233	582	1,207	1,965
Extension	-	294	700	6,090
Fisheries	76	277	363	1,670
Livestock	113	387	647	2,600
Irrigation	1,908	6,587	8,546	14,970
Forestry	117	528	708	4,500
Land Development Incl.				
Land Use	81	364	667	11,600
Cooperatives	90	362	527	710
Credit	-	-	1,100	+++
Farmer Aid Programme	-	800	750	-
Local Administration and Accelerated Rural Development+	+++	+++	451	1,080
Integrated Rural Development	+++	+++	+++	3,000
Bufferstocks (price stabilization)	-	-	-	3,080
State Enterprises	122	466	662	**
Other or not specified	91	160	403	-
Foreign Grants	144	550	850	-
Total	2,975	11,357	17,581++	51,265++
Of which not specified as agricultural	-	-	3,886	12,165

Notes: The figures in this table are derived from the original plans and may have been revised later on.

* Almost all foreign loans are intended for Irrigation and added to the budget for Irrigation.

** Foreign loans and grants and budgets for state enterprises added to various subjects.

+ Agricultural part only.

++ The total agricultural budgets for the third and fourth plan are 13,695 million baht and 39,100 million baht. Apparently part of the budgets are considered non-agricultural.

+++ Not available.

Source: Derived from: Meer, C.L.J. van der, Rural Development in Northern Thailand, An Interpretation and Analysis, Groningen, 1981, p. 271. NEDB, The National Economic Development Plan 1961-1964, Second Phase: 1964-1966, p. 61; The Second National Economic and Social Development Plan 1967-1971, p. 141-152; NEDB, The Third National Economic and Social Development Plan 1972-1976, pp. 234-235; NESDB, The Fourth Five-Year Plan 1977-1981, pp. 524-559. (Quoted from Rijk and Meer, 1984, Annex N, p. 3).

Note: Baht/dollar conversion rate B23 = \$1.

TABLE 6: Foreign Assistance (Grants) to Thailand 1972-1982 1/

(unit: US \$ million)

Year	Total	Agriculture		Other	
		Value	% of Total	Value	% of Total
1972	34.8	6.0	17.3	28.8	82.7
1973	31.2	4.7	15.0	26.5	85.0
1974	36.5	6.1	16.9	30.4	83.1
1975	32.5	7.3	22.3	25.3	77.7
1976	38.4	7.1	18.6	31.3	81.4
1977	45.2	11.8	26.2	33.4	73.8
1978	59.8	18.2	30.5	41.6	69.5
1979	82.3	22.8	27.7	59.5	72.3
1980	141.5	59.5	42.1	81.9	57.9
1981	175.5	43.1	24.6	132.4	75.4
1982	160.9	65.1	40.4	95.8	59.6

Source: Department of Technical and Economic Cooperation "Unpublished Data Sheets."

1/ This table was prepared by Dr. Theodore Panayotou, ADC/Bangkok, under USAID Purchase Order No. 498-0249-0-00-4015-00.

TABLE 7: Foreign Loans to RTG by Sector 1972-1982 1/

(unit: US \$ million)

Year	Total	Agriculture		Other	
		Value	% of Total	Value	% of Total
1972	125.4	-	-	-	-
1973	102.5	5.5	5.36	97.0	94.64
1974	437.4	12.0	2.74	425.4	97.26
1975	230.0	104.0	47.39	121.0	52.61
1976	408.4	105.1	25.73	303.3	74.26
1977	707.7	107.6	15.20	600.1	84.70
1978	1,185.2	61.1	5.15	1,124.1	94.84
1979	1,720.4	140.2	8.15	1,580.2	91.85
1980	1,952.0	206.3	10.57	1,770.9	90.75
1981	1,616.4	120.1	7.43	1,396.3	92.56
1982	2,099.5	256.2	12.21	1,843.3	87.78

Source: Bank of Thailand "Unpublished Data Sheets."

- Figure not available.

1/ This table was prepared by Dr. Theordore Panayotou, ADC/Bangkok, under USAID Purchase Order No. 498-0249-0-00-4015-00.

TABLE 8: Sector distribution of World Bank Lending Program for FY 1982-86

<u>Sector</u>	<u>No. of Projects</u>	<u>Allocation US \$million</u>	<u>% of Total Allocation</u>
Agriculture and Rural Development	18	1,330	37
Transportation and Communications	4	300	8
Basic Needs	4	290	8
Energy and Power	7	690	19
Industry	3	255	7
Urban	4	160	4
SAL	3	575	16
	<hr/>	<hr/>	<hr/>
	43	3,600	100%

Source: World Bank FY 82-86 Lending Program

TABLE 9: Foreign assisted^a MOAC projects (1973-1988)

Type of Project	Project Time Frame	Budget (million baht)
1. Irrigation and energy	1976 - 1988	28,721.13
2. Crop improvement	1973 - 1986	2,084.16
3. Fisheries development	1979 - 1985	40.72
4. Livestock development	1981 - 1986	365.32
5. Vegetable, fruits, perennial crop development	1976 - 1987	33,705.48
6. Land, forest, water supply and watershed development	1976 - 1988	6,548.81
7. Agricultural processing	1976 - 1985	40.97
8. Agricultural extension	1977 - 1984	5,980.00
9. Agricultural credit	1980 - 1984	779.10
10. Agricultural planning	1980 - 1985	1,224.68
11. Agricultural research, training and institution establishment	1977 - 1989	3,176.03
12. Village development	1976 - 1984	1,129.26
13. Unclearly specified type of agricultural and rural development project	1976 - 1988	4,453.91
Total		88,249.60

Note: Baht/dollar conversion rate $\text{฿}23 = \$1$.

^a Includes both loans and grants.
Source: Appendix I.

TABLE 10: Research and development budget by sectors

Sectors	1978		1979		1980	
	million	%	million	%	million	%
Agriculture and irrigation	797.2	54.30	558.4	41.93	661.6	43.88
Manufacturing and mining	82.2	5.60	97.0	7.28	27.2	7.08
Trade and services	-	-	27.4	2.06	27.2	1.81
Transportation and communication	47.9	3.26	63.6	4.78	106.7	7.08
Energy	26.5	1.81	34.2	2.59	34.4	2.28
Social development	43.0	2.93	37.2	2.80	43.5	2.89
Public utilities	-	-	-	-	14.4	0.96
Health	78.4	5.34	121.0	9.09	86.7	5.75
Education	20.5	1.40	23.4	1.76	8.9	10.59
Conservation of natural resources and environment	14.9	1.01	24.8	1.86	22.2	1.47
Local natural resources development	2.1	0.14	2.0	0.15	2.6	0.17
Science and technology	101.2	6.89	97.0	7.28	82.1	5.45
National security and defense	-	-	164.1	12.32	199.8	13.25
Connected with all sectors	253.5	17.27	81.0	6.08	110.5	7.23
Total	1,468.0	100.00	1,331.8	100.00	1,507.0	100.00
Percentage of GDP	464,550.0	0.31	546,449.0	0.24	659,326.0	0.22
Percentage of government budget	81,000.0	1.81	92,000.0	1.45	109,000.0	1.38

Note: Baht/dollar conversion rate B23 = \$1.

Source: Research and analysis of research budget of government agencies and state enterprises for the fiscal years 1978-80, Research Policy and Planning Division, Office of the National Research Council (Quoted from the NESDB, 1981).

- Figure not available.

TABLE 11: Capital formation in agricultural sector (at 1972 price) ^{1/}

(Unit: million baht)

Year	Private Sector		Public Sector		Total	
	gross investment	stock of capital	gross investment	stock of capital	gross investment	stock of capital
1961	588	29,348	340	16,249	928	45,597
1962	712	29,033	453	16,134	1,165	45,166
1963	953	28,969	578	16,147	1,531	45,118
1964	1,218	29,173	625	16,207	1,843	45,381
1965	1,242	29,395	704	16,344	1,946	45,733
1966	1,546	29,912	818	16,591	2,364	46,503
1967	2,371	31,236	969	16,980	2,340	48,218
1968	2,455	32,597	1,076	17,462	3,531	50,059
1969	2,204	33,660	1,142	17,993	3,346	51,653
1970	2,153	34,635	1,817	19,181	3,970	53,816
1971	2,405	35,828	1,463	19,972	3,868	55,800
1972	1,979	36,553	1,125	20,398	3,104	56,951
1973	2,627	37,900	889	20,573	3,516	58,473
1974	3,547	40,121	615	20,468	4,162	60,569
1975	3,538	42,225	1,175	20,926	4,714	63,152
1976	3,651	44,428	1,775	21,968	5,426	66,396
1977	4,396	47,288	1,789	22,988	6,185	70,257
1978	4,704	50,318	1,807	24,091	6,611	74,409
1979	5,403	53,960	1,910	25,158	7,313	79,118
1980	5,200	57,272	2,089	26,367	7,289	83,639
1981	4,566	59,834	2,068	28,711	6,634	87,347

Note: Baht/dollar conversion rate $\text{฿}23 = \$1$.

Source: General Economic Research Section, Department of Economic Research, Bank of Thailand, "Unpublished Data Sheets".

^{1/} This table was prepared by Dr. Theordore Panayotou, ADC/Bangkok, under USAID Purchase Order No. 498-0249-0-00-4015-00.

TABLE 12: Total private capital inflow classified by sector. 1/

(unit: million baht)

Year	Total	Agriculture		Industry		Other	
		value	% of total	value	% of total	value	% of total
1972	4,494.8	25.4	0.6	1,860.8	41.4	2,608.6	58.0
1973	3,875.4	5.0	0.1	1,323.3	34.2	2,547.1	65.7
1974	8,721.4	27.2	0.3	3,430.1	39.3	5,264.1	60.4
1975	7,280.4	2.1	0.0	2,949.7	40.5	4,328.6	59.5
1976	7,406.4	5.6	0.1	2,845.0	38.4	4,554.8	61.5
1977	8,897.0	1.7	0.0	3,181.9	35.8	5,713.4	64.2
1978	15,457.1	3.0	0.0	6,198.5	40.1	9,255.6	59.9
1979	24,043.0	16.1	0.1	8,112.1	33.7	15,914.8	66.2
1980	40,624.5	251.0	0.6	18,979.3	46.7	21,394.2	52.7
1981	42,647.0	77.2	0.2	18,741.8	43.9	23,828.0	55.9
1982	52,835.3	84.6	0.2	22,649.4	42.8	30,101.3	57.0

Note: Baht/dollar conversion rate $\text{฿}23 = \$1$.

Source: Bank of Thailand "Unpublished Data Sheets".

1/ This table was prepared by Dr. Theodoros Panayotou, ADC/Bangkok, under USAID Purchase Order No. 498-0249-0-00-4015-00.

TABLE 13: Projected annual growth rate of Thai agriculture by subsector,
1981-86, 1986-90

(in percent)

GDP in constant prices				Fifth	Mission	
	1960-70	1970-75	1975-80	Plan 1982-86	projections 1981-86	1986-90
Crop	4.7	5.2	3.3	4.7	4.2	4.3
Livestock	3.5	7.6	5.5	4.2	5.0	5.2
Fisheries	20.7	4.7 ^b	-3.1 ^c	5.4	3.7	4.4
Forestry	4.1	2.9	0.3	0.3	0.3	0.2
Agriculture	5.5	5.1	0.5	4.5	4.1	4.3

^a Semi-log trend regressions; 1960-70 is at 1962 constant prices and 1970-90 is at 1972 constant prices.

^b 1970-77.

^c 1977-80.

Source: World Bank (1982), Vol. II, p. 56.

TABLE 14: Discrepancy between actual and planned development expenditure as an indicator of absorptive capacity limits.

Plan/Period	Agriculture		Economy as a Whole	
	Planned(P)	Actual(A) P/A	Planned(P)	Actual(A) P/A
First Plan (1961-66)	4,622	4,203 0.91	34,471	27,617 0.80
Second Plan (1967-71)	10,645	9,735 0.91	55,712	65,937 1.18
Third Plan (1972-76)	13,695	10,961 0.80	100,275	91,548 0.91
Fourth Plan (1977-81)	39,100	25,032 .64	252,450	219,007 0.87
Fifth Plan (1982-86)	122,630	-	699,340	-

Note: Baht/dollar conversion rate B23 = \$1.

- Figures not available yet.

Source: National Economic and Social Development Board, Division of Economic and Fiscal Planning "Unpublished Data Sheets".

TABLE 15: Total Staff by Grade Level in Each Division in the Office of Permanent Secretary, MOAC

<u>Division</u>	<u>Total Authorized</u>	<u>C1</u>	<u>C2</u>	<u>C3</u>	<u>C4</u>	<u>C5</u>	<u>C6</u>	<u>C7</u>	<u>C8</u>
Central	32	3 (3)	6 -	7 -	2 (1)	8 -	- -	2 -	- -
Finance	76	1 (12)	10 (6)	14 (4)	15 (1)	8 -	4 -	- -	1 -
Personnel	28	1 (2)	- -	2 (5)	11 (1)	4 -	2 -	- -	1 -
Foreign Agricultural Relations	22	1 -	- -	5 -	4 (2)	5 -	2 -	2 -	1 -
Agricultural information	26	1 (1)	4 (1)	6 (2)	1 (6)	3 -	1 -	- -	- -
Agricultural aviation	29	2 (4)	4 (1)	8 -	5 (1)	2 -	1 -	- -	1 -
Projects	61	5 -	3 (1)	12 (17)	13 -	3 -	4 -	2 -	1 -
Inspection and Agricultural Coordination	24	1 (2)	2 -	4 (3)	1 -	- (1)	8 -	2 -	- -
Central Land Consolidation Office	183	19 (18)	18 (13)	24 (25)	25 (2)	15 (5)	8 (3)	7 -	1 -
The Royal Rain-Making Research & Development Institute	67	5 (7)	10 (9)	14 (7)	21 -	9 -	3 -	2 -	1 -
Northern Regional Office of Agriculture & Cooperatives	106	6 (7)	11 (1)	18 (8)	29 (1)	16 -	8 -	1 -	- -
Northeast Regional Office of Agriculture & Cooperatives	131	6 (27)	11 (9)	18 (5)	29 -	16 (4)	8 -	1 -	- -
Central Regional Office of Agriculture & Cooperatives	93	14 (3)	11 (5)	11 (8)	22 -	9 (1)	8 -	1 -	- -
Southern Regional Office of Agriculture & Cooperatives	50	1 (11)	4 (1)	3 (4)	8 -	9 (4)	4 -	1 -	- -
Total Authorized Staff	958								

Note: (...) = Positions not filled.
Source: Foti (1983).

APPENDIX I

May 31, 1984

Listing of Foreign Assisted Agriculture Projects

Project Name	Donor	Project Timeframe	Budget (Million Baht)		Imple. Agency	Project Location	
			Loan	Grant			Counterpart
1. Thai-IRRI Deep Water Rice Project	IRRI Rockefeller	1973 - indefinite	-	2	-	2	DOA Rice Experiment Stations in Ayuthaya Pathum Thani, and Prachin Buri
2. Acceleration of Increase in Rice Fields	Rockefeller Foundation	1975 - indefinite	-	-	-	-	KU Kasetsart University
3. Technical Improvement of Wheat	Rockefeller Foundation	1980 indefinite	-	-	-	-	DOA Department of Agriculture
4. Social-Service Assessment of Cropping System Experiments in Phrae and Kampaeng Phet	Rockefeller Foundation	1979 indefinite	-	-	-	-	TU 1/ DOA Phrae and Kampaeng Phet
5. Phitsanulok Irrigation Project	IBRD	1976-1985 (9 years)	2,185	-	5,060	7,245	RID Phitsanulok, Phitchit, and Nakhon Sawan--approx. 579,000 rai.
6. The Chao Phya Irrigation Agricultural Development Project stage II - Royal Irrigation Dept. - Department of Fisheries	IBRD	1978-1984 (4 years)	980	-	1,061.60	2,041.60	RID Chai Nat, Land Reform in the area of approx. 394,000 rai and improve irrigated area of 862,000 rai
7. National Agricultural Extension Project - Phase I (terminated) - Phase II	IBRD/USAID	1977-1984 (8 years) 1977-1983 1979-1984	1,420 620 720	- - -	1,070 570 600	3,390 1,190 1,320	DOAE Phase I in 33 provinces; Phase II in 15 provinces
8. Northeast Thailand Irrigation Project Stage II	IBRD/IFAD	1980-1985 (4 years)	805	-	1,693	3,108	RID Amphoe Soongnern & Amphoe Muang, Korat; Amphoe Yangtalar, Kalasin; in the areas of 320,325 rai.
9. Irrigation XI Project (Mae Klong, Pattani)	IBRD	1980-1986 (6 years)	1,840	-	2,333	4,173	RID Pattani and Yala in the areas of 93,750 rai.
10. Irrigation XII Project (Malaiman I)	IBRD	1981-1987 (6 years)	1,140	-	1,160	2,300	RID Suphan Buri, Kanchanaburi in the areas of 169,000 rai

1/ Thammasat University

2/ USAID supported the National Agricultural Extension Project from 1977-1982 providing \$3 million.

Project Name	Donor	Project Timeframe	Budget (Million Baht)		Imple. Agency	Project Location		
			Loan	Grant			Counterpart	Total
11. Agricultural Credit I Project	IBRD	1981-1984 (3 years)	380	-	390	770	BAAC	Country wide
- BAAC			301.50	-	246.69	548.19		
- Dept. of Coop. Auditing			19.55	-	50.27	69.82		
- Dept. of Coop. Promotion			57.41	-	88.96	146.37		
- Office of Ag. Economics			1.54	-	4.08	5.62		
12. Second Fruit and Tree Project	IBRD/CDC	1982-1987 (5 years)	3,606	-	5,138	8,744	Rubber Aid Fund, DOA	Country wide
- Rubber-Aid-Fund			3,600	-	5,132	8,732		
- Office of Ag. Economics			6	-	6	12		
13. Land Reclassification for Giving Six Right to the Encroachers	IBRD	1982-1987 (5 years)	-	168.50	149.09	317.59	DLD	Country wide
14. Rubber Replanting I (Terminated)	IBRD/CDC	1976-1981	1,150	Quasi			Rubber Aid Fund	
15. Northeast Thailand Rural Development	IBRD	1976-1982	483	MOI take out			ARD	Roads, wells
16. National Agricultural Research	IBRD/IAD	1980-1989	690	-	-	690	RFD, NESDB, PMD, DLD, OAE, OHSMI	Highland-upland forestry
17. Land Reform Areas	IBRD	1982-1988	391	New Project (add)			ALRO, DLO OAE	
18. Second Tree Crop Project	IBRD (5 years)	1982-1987	3,204	3,300	672	7,176	Rubber-Aid-Fund DOA, DLD & OAE	In the rubber planting area in the South and East in the area of 1.25 million rat
- Rubber-Aid-Fund			3,196	3,300	560	7,056		
- Dept. of Agriculture			5	-	105	110		
- Dept. of Land Development			3	-	1	4		
- Office of Ag. Economics			-	-	6	6		
19. Second Rubber Replanting II	CDC/IBRD	1982-1987	320				ORRAF	
20. Agricultural Credit II	IBRD	1983-1986	1,510	-	Unk 1/	1,510	BAAC	Country wide

1/ Unk = Counterpart being provided, amount not known.

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Project Location	
			Loan	Grant	Counterpart Total		
1. Land Titling	IBRD	1984-1991	805	-	Unk 1/	805	ARD, OLD Country wide ALRO
2. Structural Adjustment Loan I (SAL #1)	IBRD	1982-1986					
- Land Reclassification (Phase I)			161	-	-	161	OLD/RFD Country wide
- Public Sector - Supply of Fertilizer			30	-	-	30	OAE
3. Structural Adjustment Loan II	IBRD	1983-1987					
- Land Reclassification (Phase I)			161	-	-	161	OLD/RFD Country wide
- Public Sector Distribution of Supplies			30	-	-	30	
4. National Rural Development I	IBRD	1984-1988	850	-	Unk 1/	850	ARD Country wide
5. Nong Mai Pioneer Agriculture Project	ADB	1976-1984 (9 years)	100	6	457.82	563.82	RID Khon Kaen--approx. 75,000 rai.
- RID			100	-	450	550	
- DOAE			-	6	7.82	13.82	
6. Agriculture Development Project in the Kingdom of Thailand	ADB/EEC	1980-1984 (5 years)	280	20	536.47	836.47	DOF Samut Sakhon, Samut Prakan, Samut Songkhram, Prachin Buri, Chonburi, Chachoerngsao, Saraburi, Pathum Thani, Nakhon Nayok, Rayong, Surat Thani, Trat, Nakhon Si Thammarat, Nakhon Pathom.
- Dept. of Fisheries			59.52	-	24.67	84.19	
- Dept. of Ag. Extension			76.85	14.13	105.13	196.42	
- BAAC			64.64	-	238.17	302.81	
Note: Reserved funds			78.99	5.87	168.17	253.03	
- Dept. of Land Development			156.40	-	100.20	256.60	Chiang Mai, Lamphun, Lampang,
- Office of Ag. Economics			2.27	-	2.66	4.93	Phrae, Nan, Chiang Rai, Phayao
- Royal Forest Department			57.05	-	66.95	124.01	
7. Medium Scale Irrigation Project	ADB	1982-1988 (7 years)	800	-	780	1,580	RID Chiang Mai, Chai Nat, Prachin Buri and Chanthaburi

/ Unk = Counterpart being provided, amount not known.

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Imple. Agency	Project Location
			Loan	Grant	Counterpart		
28. Maize Development Project in Thailand	JICA	1976-1982 (follow-up 2 yrs.)	-	43.03	53	96.03	DOAE Petchabune, Phitsanulok, Sukhothai, Lopburi, Saraburi and Si Sa Ket
29. Suphan Buri Experiment Station and Training Center	JICA	1977-1984 (8 years)	-	18	6	24	DOA Experiment Station and Training Center, Suphan Buri
30. Songkhla Coastal Aquaculture Development Project	JICA	1981-1986 (5 years)	-	110	49.73	159.73	DOF Songkhla
31. Agriculture Cooperatives Promotion Project	JICA	1980-1984 (5 years)	645.70	262.60	149	1,057.30	DCP Chiang Mai, Lop Buri, Nakhon Ratchasima, Songkhla
32. Plant Quarantine System	JICA	1980-1984 (5 years)	-	3.39	5.71	9.10	NOA Plant Quarantine Division, NOA
33. National Weed Science Research Institute Project	JICA	1980-1985 (5 years)	-	32.8	7.2	40	NOA Department of Agriculture, Ban
34. Small Scale Irrigation Program Stage II	OECD	1981-1985 (5 years)	466	-	3,563	4,029	RI0 Country Wide
35. The Third Country Training of Foot and Mouth Disease Control	JICA	1981-1986 (5 years)	-	4.20	.28	4.48	DOLD Foot & Mouth Disease Control Ce Pakchong, Nakhon Ratchasima
36. Animal Health Improvement Project consists of 3 sub-projects:	JICA	1977-1985 (8 years)	-	79.0	175.28	254.28	DOLD
a. Training on Foot & Mouth Disease Control		1981-1986 (5 years)	-	-	.28	1.28	DOLD In 15 southern provinces; Project sites at Nakhon Ratchas and Nakhon Si Thammarat
b. Foot & Mouth Disease Vaccine Production Center		1981-1984 (3 years)	-	197	173	370	DOLD In 16 southern provinces; Project sites at Nakhon Ratchas and Nakhon Si Thammarat
c. South Regional Veterinary Diagnostic Laboratory Center		1982-1984 (3 years)	-	2	2	4	DOLD In 16 southern provinces; Project sites at Nakhon Ratchas and Nakhon Si Thammarat
37. Small Scale Irrigation Program Stage III	OECD	1982-1987 (5 years)	439	-	1,300	1,739	RI0 Country Wide

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Agency	Project Location
			Loan	Grant	Counterpart		
38. Research and Training in Reforestation Project	JICA	1981-1986 (5 years)	-	41.7	40.64	RFD	Amphoe Pakthongchai, Korat
39. Technological Development Natural Rubber Project	JICA	1977-1983 (2 years)	-	22.5	-	DOA	Rubber Research Station, Yala and every rubber experiment station
40. Seed Multiplication Project	OECF	1982-1986 (5 years)	432	-	758	DOAE	Phayao, Phrae, Nakhon Sawan, Kamphaeng Phet, Ubon, Roi Et, Udorn, Surin, Khon Kaen, Sakon Nakhon, Chonburi and Ratchaburi
41. Organic Recycling for Soil Productivity Improvement Project	OECF	1982-1986 (5 years)	53.62	-	22.50	DLD	In rural areas in 37 provinces
42. Agricultural Development Research Center (ADRC) in the Northeast	JICA	1983-1987 (5 years)	-	128	50	DLD	In Northeast Thailand
43. East Coast Water Pipeline System Project						DA, KKU	(Center located in Khon Kaen)
a. Mamthaphud Irrigation Development Project	OECF	1982-1986 (4 years)	629	-	310	RID	Rayong
b. Nong Plalai Irrigation Development Program	OECF	1982-1986 (4 years)	31	-	9	RID	Amphoe Ban Bung, Chongburi
44. Kaeng Khoi Ban Mo Irrigation Development Project	OECF	1981-1987 (5 years)	18.20	-	4.40	RID	Saraburi
45. Mae Kwang Irrigation Development Project	OECF	1982-1988 (6 years)	41.00	-	9.20	RID	Chiang Mai
46. Freshwater Fisheries Center in middle part of South Thailand	Japan	1983-1985 (3 years)	-	60	4.70	DOF	Surat Thani, 600 rai
47. Freshwater Fisheries Center in lower part of South Thailand	Japan	1983-1985 (3 years)	-	20	10.80	DOF	Trang, 500 rai
48. Central Region Seed Fish Production Center	Japan	1983-1985 (3 years)	-	40	12.10	DOF	Ayutthaya

Project Name	Donor	Project Time-frame	Budget (Million Baht)		Counterpart	Total	Imple. Agency	Project Location
			Loan	Grant				
49. Central Forest Research Laboratory and Training Center	Japan	1982-1984	-	200	-	200	RFD	RFD and Nakhon Ratchasima
50. Construction of two water tanks in Surin and Buriram Provinces	Japan	1981-1982	-	-	-	-	R10	Surin and Buriram
51. Irrigated Agriculture Development (Pilot Project)	JICA	1977-1982 (I) 1982-1985 (II)	275	109.52	47	156.52	DOA/ MOF	Irrigated area in the lower of Phya, Mae Klong Rivers and Supa
52. Bio-mass Energy	Japan	1980-1982	-	320 ('80) 340 ('81) 360 ('82)	-	320 ('80) 340 ('81) 360 ('82)	DOA	Department of Agriculture
53. Grant Aid for Promotion of Food Production - Rice/Soil Fertility - Rice Production Fertilizer	Japan	1978- Indefinite 1978-Indefinite 1978-Indefinite	-	2/ - - -	-	-	CPD/ MOF/ DOA/	Irrigated area in the lower of Phya, Mae Klong Rivers and Petch Sukhothal, Lop Buri and Saraburi
54. Feasibility Study on the Loel Pasak Multipurpose Project 3/	Japan	8 months	-	4/ -	-	-	R10	Loel and Phetchabun
55. Logging & Log Transportation Project	JICA	1983-1988	-	2.4	-	2.4	F10	Forest Industrial Organization Lampang and Chiang Mai
56. Upper Pasak Medium Scale Irrigation 5/	Japan	1981-1982	6/ -	-	-	-	R10	Nakhon Sawan
57. Irrigation Engineering Center	Japan	1983-1985	-	177	-	177	R10	Bangkok and Nonthaburi
58. Research and Development Project Kasetsart University	JICA	1980-1985	-	181.5	18	199.5	KU	Kamphaengsaen Campus
59. Agricultural Extension and Agricultural mechanization Project	JICA	1981-1986	-	293	30	323	KU	Kamphaengsaen Campus

1/ In kind support in form of consultants.
 2/ In kind commodities (fertilizer, equipment and chemicals being provided).
 3/ Project under consideration, will be reviewed in July 1983.
 4/ In-kind support in form of experts/survey team.
 5/ Project approved in principle, project documents not received by DTEC yet.
 6/ Consultant services.

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Imple. Agency	Project Location
			Loan	Grant	Counterpart Total		
60. Seed Development Project - Phase I - Phase II	USAID	1976-1981 1982-1986	214.30	8.30	278.56	501.16	Seed Centers at Phitsanulok, Korat, Lampang, Chat Nat, Kalasin, and Chiang Mai.
61. Rhizobium Inoculum Production I/	USAID	1977-1982 (6 years)	8	-	8	16	Plant Pathology Division
62. Lam Nam Oon Integrated Rural Development Project - Royal Irrigation Dept. - Dept. of Agriculture - Dept. of Agri. Extension - Dept. of Fisheries - Community Development Dept. - Non-Formal Education Dept. - Dept. of Public Welfare	USAID	1978-1985 (7 years)	90	-	785.92	875.92	Sakhon Nakhon Province
63. Mae Chaem Watershed Development Project - Office of Permanent Secretary - Royal Forest Department - Department of Agriculture - Dept. of Ag. Extension - Dept. of Land Development - Dept. of Teacher Education	USAID	1981-1987 (7 years)	-	200	220	420	Amphoe Mae Chaem, Chiang Mai in the areas of approximately 42,000 square km.
64. Northeast Small Scale Irrigation	USAID	1981-1986 (6 years)	116	56	166	338	Improve 7 irrigation tanks in the Northeast--Roi Et, Kalasin, Ubol, Nakhon Phanom, Buri Ram, and Korat
65. Northeast Rainfed Agricultural Development - Permanent Secretary Office - Dept. of Fisheries - Royal Forest Department - Dept. Livestock Development - Dept. of Agriculture - Dept. of Ag. Extension - Office of Ag. Economics	USAID	1982-1988 (7 years)	126	74	114.50	314.50	Operate in 8 tambons, 7 amphoes and 4 changwats in the Northeast--Chatyaphum, Roi Et, Nakhon Phanom and Si Sa Ket
66. Agricultural Planning Project	USAID	1981-1985	-	63.78	20.72	84.50	Country Wide

1/ This project is part of the Seed Development Phase I Project noted in No. 55.

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Imple. Agency	Project Location
			Loan	Grant	Counterpart		
67. ASEAN Agricultural Planning	USAID	1981-1985	-	60	22.80	82.80	OAE ASEAN countries
68. Village Woodlot (Component of Renewable Energy Project)	USAID	1981-1985	-	9.30	7.19	16.49	RFD Khon Kaen, Roi Et, Maha Sarakha and Yasothon
69. Thai 4M Foundation (PYO activity)	USAID	1982-1984 (3 years)	-	3.20	1.20	4.40	DOAE Country Wide
70. Soil and Water Conservation Project	USAID	1983-1988 (6 years)	296 1/2	-	1,000 1/2	1,296	DLN/DOA DOAE In five (5) provinces in the Northeast
71. Khon Kaen University Research Development Project	USAID	1983-1989	-	46	32.9	88.9	KKU Northeast provinces
72. Reforestation in Northeast Thailand	UNDP/FAO	1981-1986 (5 years)	-	24.08	30.58	54.66	RFD Amphoe Pakthongchai, Korat
73. Rural Development through Watershed Management in the Namphong Basin	UNDP/FAO	1982-1986 (5 years)	-	2.64	60	62.64	RFD Amphoe Namphong, Khon Kaen
74. Blue Green Algae for Rice Production	UNDP/FAO	1982-1983 (2 years)	-	.14	-	.14	DOA Rice Experimentation Station, R Division, DOA
75. Strengthening Plant Protection Services of Thailand - Phase II	UNDP/FAO	1976-1984 (2 years)	-	23.85	31.23	55.08	DOAE DOA Country Wide
- Phase III			-	8.83	7.34	16.17	
76. Regional Network for Agricultural Machinery	ESCAP	1982-1984 (3 years)	-	2.43	.50	2.93	DOA Agricultural Engineering Division Department of Agriculture
77. Small-scale Fisheries Project	FAO	1979-1985 (7 years)	-	6.45	7.43	13.88	DOF Panga, Satoon, Trang and Krabi
78. Assistance to Agriculture Cooperatives in Paddy Procurement and Parboiling	FAO	1980-1984	-	13.50	2.3	15.80	DCP Chachoengsao

1/ Estimated

Project Name	Donor	Project Timeframe	Budget (Million Baht)		Loan	Imple. Agency	Project Location
			Grant	Counterpart Total			
9. Rainfed Crop Production Research and Development Project	UNDP	1980-1986	14.99	8.12	-	DOA	Surin, Mahz Sarakhain, Sukhothai, and Payao
10. Bridging Assistance for Accelerated Rubber	UNDP	1980-1983 (3 years)	15.71	123.53	-	DOA	Rubber Research Center, Rubber Experiment Station, and Office of Rubber-Aid Fund
11. Reforestation in Northeast Thailand	UNDP/FAO	1981-1986	24.08	30.38	-	RFD	Amphoe Pakthongchai, Nakhon Ratchasima
12. Yield Increase through the Use of Fertilizers and Related Inputs	FAO	1981-1983	7.76	6.52	-	DOA	Country Wide
13. Agricultural Machinery Production	UNDP/FAO	1981-1984	35.65	3.77	-	DOA	Bangkok, Lampang, Chiang Mai
14. Village Woodlot Improve Stove and Forest Industry	ESCAP	1982-1983 (2 years)	.34	-	-	RFD	Amphoe Laharnsai, Buri Ram
15. Northern Agricultural Development Center Phase II	UNDP	1977-1984	41.11	-	-	OPS 2/ NADC 3/	Chiang Mai, Tak, Lamphun, Lampang Chiangrai, Nan, Mae Hong Son and Phrae
16. Strengthening the Implementation of Integrated Agricultural Development Planning	UNDP	1983-1984	2.10	-	-	OPS 2/ NADC	Northern Thailand
17. Pond Management Techniques and Disease Control	UNDP/FAO	1979-1983	9.3	-	-	DOF	Bangkok and Suphan Buri and Chainat
18. Assistance to the Rubber Replanting and Research Program	UNDP	1982-1986	25.21	1,620.91	-	DOA	East, North, Northeast, & South of Thailand
19. Mae Sa Watershed Development Phase II	UNDP	1978-1982	32.22	33.37	-	RFD	Chiang Mai

/ Inclusion of Baht 1.56 million for fertilizer.
 // Office of Permanent Secretary
 // Northern Agricultural Development Center

Project Name	Donor	Project		Budget (Million Baht)			Imple. Agency	Project Location
		Timeframe	Loan	Grant	Counterpart	Total		
90. Highland Agricultural Marketing and Production Project	UNFDAC	1980-1982 (I) 1983-1984 (II)	-	59.18 29.85	24.90 9.57	84.08 39.42	ONCB 1/ BAAC	Chiang Mai and Lampang
91. Assistance in the Production of Pharmaceuticals from the Thai Traditional Pharmacopoeia	UNIDO	1983-1984	-	6.05	5.64	11.69	TISTR 2/	Thailand Institute of Scientific and Technology Research
92. Seed Center Southern Region	ECC	1981-1986	-	55	38.23	93.23	DOAE	Phatthalung
93. Crop Development--Northeast								
a. Thai/EEC Crop Diversification Project (Terminated)	ECC	1980-1981	-	54	Unk	54	DOA	Experimentation Stations in the Northeast
b. Thai/EEC Crop Diversification Project (Terminated)	ECC	1982-1983	-	11	Unk	11	DOA	Experimentation Stations in the Northeast
c. Crop Development (Phase II)	ECC	1984-1987	-	101	39	140	DOA, KKU NERAOC DOAE, DLD	Northeast Thailand
94. Rubber Small Holdings Yield Improvement	ECC	1980-1984 (5 years)	-	37	37	74	DOA	Rubber Research Centers and Rubber Experimentation Station in southern and eastern regions
95. Agricultural Cooperatives Management Training and Development Phase I & II	ECC	1981-1988	-	113	50	163	MACTI 3/	Bangkok, Lop Buri, Khon Kaen, Chiang Mai and Songkhla
96. Huai Mong Irrigation and Drainage	ECC	1982-1986	-	27 4/	92	363	NEA	Nongkhai
97. Sukhothai Groundwater Project	ECC	1979-1985	100	304 5/	276	530	RID	Sukhothai
98. Oilseed Crops Development Program	ECC	1983-1985	-	68	19	87	TISTR Regional Univ., KU DOAE, DOA	Countrywide

- 1/ Office of Narcotics Control Board
- 2/ Thailand Institute of Scientific and Technology Research
- 3/ National Agricultural Cooperative Training Institute
- 4/ Belgian Government providing 100 million Frans in kind support
- 5/ UK TA Grant equal to 0.819 million UK pounds

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Total	Agency	Project Location
			Loan	Grant	Counterpart			
99. Cashew Development Project	EEC	1093-1986	-	27	13	40	DDA, DDAE CPD, ALRO BAAC Northeast	
100. ASEAN-Canada Forest Tree Seed Center	CIDA	1981-1984 (3 years)	-	30	20	50	RFD Amphoe Muaklek, Saraburi	
101. Khon Kaen University Research and Development Institute	CIDA	1984-1989	-	73.5	31.7	115.2	KKU All of the Northeast	
102. Thai FIDEP	CIDA	1982-1987	-	8.75	Unk 1/	8.75	DOF Rayong	
103. Department of Fisheries Advisor	CIDA	1982-1984	-	8	Unk 1/	8	DOF National Inland Fisheries Institut	
104. Lahan Sai Rural Development Irrigation/Food Processing (part of King's sponsored project)	CIDA	Indefinite	-	4.4	Unk 1/	4.4	RID KMIT 2/ Buriram	
105. Village Level Rice Milling	IDRC	1979-1982 (4 years)	-	1.22	-	1.22	DDA Klong Luang Rice Mill, Pathum Thani	
106. Sorghum Cropping System/Breeding Project	IDRC	1980-1982	-	9.91	-	9.91	DDA Ratchaburi, Phrae, Nakhon Ratchasima, Ubon Ratchathani, Kamphaeng Phet	
107. Home Processed Legumes	IDRC	1978-1985	-	4.81	-	4.81	KKU Khon Kaen	
108. Improvement of Groundnut for Thailand	IDRC	1982-1985	-	1.96	2.84	5.8	DDA/KKU/ KU Primarily Northeast Thailand	
109. Fish Processing	IDRC	1980-1983	-	1.46	-	1.46	DOF Department of Fisheries, Bangkok	
110. Development of Peanut Shelling Machine	IDRC	1981-1983	-	0.799	2.2	2.99	KKU KKU, Ubolratana Land Settlement	
111. Vegetable Seed Production in Opium and Rice Based Agriculture	IDRC	1982-1985	-	4.3	.86	5.16	CMU Chiang Mai University	
112. Water Buffalo Information Center at Kasetsart University	IDRC	1981-1984	-	4.15	-	4.15	KU Kasetsart University Library	

1/ Unk = Counterpart being provided, amount not known.
2/ King Mongkut Institute of Technology

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Imple. Agency	Project Location
			Loan	Grant	Counterpart		
113. Fish Genetics in Thailand	IDRC	1981-1984	-	5.11	5.31	10.42	DOF Country, Wide
114. Silviculture Research and Utilization of Bamboo Forest in Thailand	IDRC	1983-1986	-	1.37	-	1.37	RFD/KU Kanchanaburi, Chiang Mai, Loei, Surat Thani, Trang, Khon Kaen, Phayao
115. Village Food Production and Educational Planning	IDRC	1979-1983	-	1.22	-	1.22	DOA Klong Luang Rice Mill Pathum Thani
116. Nam Pong Irrigation Project	KFW	1979-1985	400	-	653.73	1,050.73	DOA/RID Nam Pong, Khon Kaen
- Royal Irrigation Dept. - Dept. of Agri. Extension	West Germany	(6 years)	397.10	-	650	1,047.10	
117. Salinity and Brackish Water Tolerance Rice Project	Rural Foundation of Thailand w/German Government	1979-1984 (6 years)	-	8	-	8	DOA Chachoerngsao, Prachin Buri, Rayong, Chanthaburi, Petchaburi, Phatthalung, Nakhon Si Thammarat, Songkhla, Pattani, Nakhon Ratchasima and Sakon Nakhon
118. Attitudes of Farmers in Khon Kaen towards the Agricultural Development Project of the Government	Friedrich Ebert Stiftung (FES)	1982-3/1983 (15 months)	-	0.08	-	0.08	KKU Khon Kaen
119. Enhancing Income-Generating Activities among Cooperative Members' Housewives	FES	1983-1984	0.402	-	-	0.402	CPD Yasothon
120. Agriculture, Farm Management and Health Training Project	Konrad Adenauer Stiftung	1981- Indefinite	9.56	-	-	9.56	CBFPS 1/ North and Northeast Thailand
121. The Animal Nutrition 2/	Germany	1981-1983	-	0.56	-	0.56	CMU Chiang Mai University
122. Sukhothai Groundwater Project	United Kingdom	1976-1983 (5 years)	90	-	365	455	RID Amphoe Swankaloke, Sukhothai
123. Coconut Development in Southern Thailand	United Kingdom	1976- Indefinite	-	3/	-	-	DOA Amphoe Sawi, Chumphorn

1/ Community Based Family Planning Service
 2/ This project is being considered for an extension
 3/ Experts and equipment

Project Name	Donor	Project Timeframe	Budget (Million Baht)			Imple. Agency	Project Location
			Loan	Grant	Counterpart		
124. Acid Sulphate Soil Improvement	United Kingdom	1979-1985	-	1/	-	DLD	Bangkok, Makhon Nayok, Prachin Bur Chachoengsao
125. Small-holder Production of Coffee UK	UK	1979-1983	-	1/	-	OPW	Chiang Mai
126. Rainfed Agricultural Pilot Project	IDA	1980-1984 (5 years)	60	-	60	OPS	Chiang Mai and Khon Kaen in the areas of 5,000 rai.
127. Northern Agricultural Land Development Project	IDA	1980-1984 (5 years)	500	-	530	DLD	
128. Long-term Storage of Milled Rice	ASEAN/Australia Food Handling Project	1982-1983 (2 years)	-	.55	-	DOA	Department of Agriculture
129. Golok River Basin Water Resources and Rural Development Study - Royal Irrigation Dept. - Royal Thai Survey Dept.	Australia Malaysia	1983-1985 (3 years)	-	68	24	OPS RID/RTS	Narathiwat approximately 1,719 sq.km.
130. Pasture Improvement in the Northeast 2/	Australia	1978-1984	-	27	-	KKU	Khon Kaen
131. Feasibility Study of Agricultural Development Based Groundwater Utilization in Pichit Province	Australia	1980-1984	-	2.8	0.55	ROD	Phichit
132. National Agricultural Research Project	Australia/IBRD	1981-1989	1,035	115.3	1,050	DOA	In 19 research centers countrywide
133. Thai-Australian-World Bank Land Development 3/	Australia	1981-1985	-	1,012.75	70.6	DLD	Chiang Mai, Lampang, Phrae, Nan, Phayao, Lamphun, and Chiangrai
134. Tung Kula Ronghai Rural Development Phase I, II, and III	IOAB	1978-1983	-	67	-	DLD	Khon Kaen Province

/ Experts

// After 1982 resources limited to long term training.

/// Extension being discussed, will include additional funds and extend time frame.

Project Name	Donor	Project Timeframe	Budget (Million Baht)		Total	Imple. Agency	Project Location
			Loan	Grant			
135. Technical Assistance for Applied Research in Coastal Aquaculture Maliluse	ICLARM	1981-1982	-	7.02	7.12	DOF	Gulf of Thailand
136. Acid Sulfate Soils Improvement Project	IOAB	1982-1986 (5 years)	160	-	234.96	DLD	Ayutthaya, Pathum Thani, Saraburi, Nakhon Nayok, Chachoerngsao and Prachin Buri
137. Veterinary Administrative Development Program	New Zealand	2/4 - 2/22 1983 (3 wks)	-	.14	.14	DOLD	DOLD
138. Construction of Silos	New Zealand	1976-1980	-	-	-	MOF/CPD	Phetchabun, Lop Buri, Saraburi, Khon Kaen and Suphan Buri
139. Food Technology	New Zealand	1978-1983	-	-	-	Five Univ.	Chulalongkorn, Kasetsart, Chulalongkorn, Kasetsart, Chulalongkorn, Prince of Songkhro
140. Marine Biological Center Phuket	Denmark	1968-1988	-	16.28	16.28	DOF	Phuket
141. Genetic and Silviculture of Teak Conifer and Eucalypts	Denmark	1969-1986	-	-	-	RFD	Chiang Mai, Tak, Chumphon
142. Expert in Dairy Plant Management	Denmark	1982-1984	-	-	-	DFPO 1/	Dairy Farming Promotion Organization
143. Irrigation	France	1983-1984	-	2/	-	RID	RID and other provinces
144. Detection Oestrus for Use in Artificial Insemination of the Swamp Buffalo	Netherlands	1980-1983	-	3	3	CU/DOLD	CU and Surin Livestock Station
145. Lam-Pao Service Center	Netherlands	1980-1985	-	6.4	6.4	PAAC	Lam Pao Irrigation, Kalasin
146. Arabica Coffee Research and Development Center	Netherlands	1983-1987	-	13.28	17.78	ONCB 3/	Highland Agricultural Experiment Station, Ban Khun Chang Khlan Chiangmai

- 1/ The Dairy Farming Promotion Organization of Thailand
- 2/ Experts
- 3/ Office of the Narcotics Control Board

Project Name	Donor	Project Timeframe	Loan	Budget (Million Baht)		Total	Imple. Agency	Project Location
				Grant	Counterpart			
47. Opium Replacement Project	USNCU 1/	1978-1983 2/	-	36.34	11.5	47.84	ONCB 3/	Northern Highland
48. Royal Project	USDA	1973-1983 2/	-	82.8	82.8	16.56	ONCB	Northern Highland
49. Thai-German Highland Development Project	German Agency for Technical Cooperation (GTZ)	1981-1987	-	165.6	23	188.6	ONCB	Northern Highland

/ U.S. Narcotics Control Unit.
 // Subject to periodic review and extension by the funding agency.
 // Office of the Narcotic Control Board.

Planned Projects in Agriculture by Donor

Project Name	Donor	Project Life	Budget (Million Baht)		Counterpart	Total	Imple. Agency	Project Location
			Loan	Grant				
1. Comprehensive Storage Facilities Development Project	JICA	1984-1986	-	2.7	-	2.7	PMD	Public Warehouse Organiz Bangkok
2. Agricultural Cooperative Promotion Project	JICA	1984-1989	-	-	-	Unk	CPD	Nakhon Ratchasima
3. Agricultural Credit Project	EEC/ADB	1984-1986	1,217	416	1,314	2,948	MOAC/ BAAC	Cassava producing areas in kind purchases
4. Irrigation XIII Medium Scale (Project appraisal completed)	IBRD	1984-1990	1,081	-	Unk	1,081	RID	4 or 5 specific sites
5. Agricultural Support Services (Project appraisal completed)	IBRD/EEC ADB/CIDA	1984-1989	940	92	575	1607	OAE, OLD DOD, DOF	Institution Building
6. SAL #III (under-discussion)	IBRD	1985-	4,025	-	Unk	4,025	NESDB	Country-wide
7. Agricultural Credit III (under preparation)	IBRD	1986-	1,150	-	Unk	1,150	BAAC/ MOAC	Country-wide
8. Tree Crops III (under preparation)	IBRD	1986-	2,070	-	Unk	2,070	MOAC/ NESDB	Country-wide
9. SAL #IV (planned)	IBRD	1987-	4,600	-	Unk	4,600	NESDB	
10. Irrigation XIV (planned)	IBRD	1987-	1,725	-	Unk	1,725	RID	
11. Agricultural Technology Transfer (under discussion)	USAID	1984-1989	103	12	49	164	MOAC, MUA MOC, MSTR	Country-wide
12. Science & Technology Development (under preparation)	USAID	1985-1990	500	-	Unk	500	MSTR	Country-wide
13. Rural Industries (under preparation)	USAID	1986-1990	2,450	-	Unk	2,450		Country-wide
14. Emerging Problems in Development II (under preparation)	USAID	1986-1990	-	414	Unk	414	DTEC	Country-wide

Project Name	Donor	Project Life	Budget (Million Baht)			Imple. Agency	Project Location
			Loan	Grant	Counterpart		
15. Pichit Land Reform Area Rural Development Support Project	IDAB	1984-1989	-	120	120	ALRO	Pichit Province
16. Tung Kula Ronghai Rural Development Project - Phase I, II, and III (completed) - Phase IV will begin July 1984	IDAB	1984-1987 1978-1983	-	67	Unk	OLD	Khon Kaen Province
17. Khon Kaen University Cereal Testing Lab	CIDA	1984-1986	-	2.6	Unk	KKU	Northeast
18. Northeast Fishery Project (Parallel project to IBRD Loan Project No. 123)	CIDA	1984-1989	-	96	Unk	DOF	Northeast