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AID 1020-25 (10-70)

REPORT U-446

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PROJECT APPRAISAL REPORT (PAR)

90-AAD-964-A1

1. PROJECT NO.	2. PAR FOR PERIOD:	3. COUNTRY	4. PAR SERIAL NO.
Multi (including 498-15-120-220)	1957 TO 1977	Asia Regional	77-2

5. PROJECT TITLE

93p

Mekong River Basin Program

6. PROJECT DURATION: Began FY 1957 Ends FY 1977	7. DATE LATEST PROP	8. DATE LATEST PIP	9. DATE PRIOR PAR
	N/A	N/A	(Ref. RED 75-1,3,5,7,8)

10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: $ 37,767,369	b. Current FY Estimated Budget: $ -0-	c. Estimated Budget to completion After Current FY: $ -0-

11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME	b. CONTRACT, PASA OR VOL. AG. NO.
1. Committee for Coordination of Investigations of the Lower Mekong Basin	Letters of Agreement
2. Governments of Khmer Republic, Laos, Thailand and South Vietnam	Letters of Agreement
3. IBRD, ADB UN Agencies, Donor Countries, Private and Public Institutions	Letters of Agreement

I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X)			B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
XXXXXXXXXXXXX			"The attached report substitutes for a regular PAR covering the period from 1957 to 1977, inclusive."	
			Specific Projects:	
RED		MCC	Basinwide Fisheries: Distribute Final Report (Ref. Bangkok 3138 of 2/9/77).	2/77
	AIT	MCC	Computer Processing Satellite Tapes: Final Report (Ref. MCC letter of 12/21/76 and RED response of 1/5/77).	3/77
		MCC	NavAids: Final Report (Refund unexpended balance received).	3/77
	IBRD	MCC	Pioneer Agricultural Projects: Refund and IBRD Final Report. (Ref. Mekong Sec. Notes of 12/76-Item 5)	3/77
	Dooley	MCC	Schistosomiasis Controls: Final accounting and refund due on both Dooley and Univ. of Lowell Contracts. (Ref. State 013495 and Hanks to MCC letter of 1/21/77)	3/77
	Snowy Mountain (Australia)	MCC	Pa Mong Optimization and Downstream Effects: Final Reports (Ref. MCC letter of 12/28/76 and RED response of 1/5/77)	3/77
	Univ	MCC	Pa Mong Resettlement: Final Report/Amend LOA permit final payment Univ. of Michigan. (Ref. Bangkok 21203 of 7/28/76)	4/77
	USGS	MCC	Potash Drilling: Final Report on Thailand. (Ref. Bangkok 3252 of 2/10/77 and State 036004 of 2/17/77)	4/77
	USGS	MCC	Hydrologic Spare Parts: Final Delivery of Equipment (Ref. State 298200 of 12/8/76)	6/77

Continued on Page 2

D. REPLANNING REQUIRES REVISED OR NEW: [ ] PROP [ ] PIP [ ] PRO AG [ ] PIO/T [ ] PIO/C [ ] PIO/P

E. DATE OF MISSION REVIEW: February 25, 1977

PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE: James F. Hanks 5/13/77

MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE: Thomas C. Irvin, Director 5/12/77

SECURITY CLASSIFICATION	PROJECT NUMBER

PAR CONTINUATION SHEET

This sheet is to be used for any Narrative Sections for which sufficient space has not been provided on the form. Identify each narrative by its Part and Section Designation.

General

AID/W Regard the Mekong Committee Secretariat as an institution through which development assistance might be provided to the Indochina countries should policy and legislative changes make such assistance possible.

AID/W Utilize the experience gained in the formation, development and operation of the Mekong Committee as a model after which to pattern river basin development schemes currently under consideration in Africa, e.g., the Sahel, or else where.

NARRATIVE IN SUPPORT OF THE PROJECT APPRAISAL REPORT AND ACCOMPANYING LOGICAL FRAMEWORK MATRIX FOR U.S. GOVERNMENT PARTICIPATION IN THE ACTIVITIES OF THE MEKONG COMMITTEE (COMMITTEE FOR COORDINATION OF INVESTIGATIONS OF THE LOWER MEKONG BASIN) OVER THE PERIOD 1957-1977

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Figure 1: Graph showing U.S. Annual Contributions Related to Total Financial Resources Received by Mekong Committee

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7.1.1 Current Status
7.1.2 Recommendations

N.B. The objective of this report is to appraise the impact of U.S. assistance through the Mekong Coordinating Committee(MCC) on the Development of riparian resources of the Lower Mekong Basin. In keeping with this objective, the geographic rather than the political designations are used for the riparian members of the MCC.

1. Introduction

1.1 The Project Appraisal Report

1.1.1 Purpose of Report

The purpose of this report is to appraise the results obtained from the U.S. Government's contributions over the 20 year period 1957-77 in support of the efforts of the Committee for Coordination of Investigations of the Lower Mekong Basin (generally referred to as the-MCC) to raise the socio-economic levels of the riparian peoples and countries. The basic approach used throughout the period has been to channel U.S. funds and other support through the MCC, in cooperation with the riparian and other countries and by utilizing a minimum of foreign personnel, to build up the staff capability of the Mekong Secretariat for carrying out and supervising both planning studies and capital projects throughout the basin. The dollar value alone of the U.S. support over the 20 year period amounts to approximately US$38 million. Neither this figure nor the appraisal itself include or address all related U.S. bilateral support rendered through the individual USAID country missions to Thailand, Laos, Cambodia, and Viet-Nam for individual projects, the bulk of which sought to build further on MCC program outputs or in some instances preceded the collaborative efforts to produce an indicate basin development program.

The reader should note that, of necessity, this review and report for the most part results in a broad-brush historical account, and are limited to only the U.S. contribution to the Mekong Committee and its Secretariat(MC/S) and the related portions of the large and complex Lower Mekong basin program. The appraisal bears heavily on the issues of basic data collection, primarily hydrological (the basis for rational water resource planning); the build-up of indigenous capabilities as opposed to turn-key approaches; and the Pa Mong dam project, the key to comprehensive development of the entire Lower Mekong basin. The report does not purport to evaluate the total $355 million (through 1976) Mekong program.

It should also be noted at the outset that it is beyond the capability of the present team to confirm all financial data for the entire 20 year period. Considerable effort, nevertheless, was expended in order to assure reasonable representation of the total program and discrete project inputs.

1.1.2 Organization of Present Report

The present report consists of five components as follows:

(a) Letter of transmittal prepared by RED Bangkok;

(b) A "Logical Framework Matrix", prepared following AID Project guidelines;

(c) The PAR report (using a modified version of the standard PAR report form);

(d) A narrative discussion, explaining, supporting, and complementing the concepts presented in the Logical Framework Matrix and the abbreviated PAR, and presenting the conclusions of the PAR review;

(e) A series of appendices presenting detailed information supporting (b), (c), and (d) above.

The report was prepared by a team assembled by RED Bangkok specifically for the purpose (See Appendix 10), over the period 1-25 February 1977, working out of RED/Bangkok. The evaluation was made with the full cooperation of Mr. W. J. van der Oord, Executive Agent of the Mekong Committee Secretariat, and his staff, who furnished much of the supporting information.

1.2 Historical Background

The region of concern to the MCC, the Lower Mekong River basin represents a sizeable portion of southeast Asia. It lies within the four Mekong basin riparian countries, and includes all of northeast Thailand, almost all of Laos (93 per cent), most of Cambodia (90 per cent) and the southern half of Viet-Nam (42 per cent). The total area of the basin in these four countries (termed the Lower Mekong Basin) is 645,355 km^2, and the total population has been estimated at 30,355,000 (1970), most of which lives in rural villages even though the main urban centers experienced great population increases during the Indo-China hostilities.

Investigations of water resource development in the Basin began in 1951. At that time, the United Nations Economic Commission for Asia and the Far East(ECAFE)(renamed ESCAP in 1974) initiated a

study of technical problems relating to flood control and water resources development of the Lower Mekong River. As a result of this study (completed in 1952), several specific mainstream projects (including Pa Mong) were proposed for further consideration.

The initial ECAFE survey was followed by other studies, including a survey of the Lower Mekong Basin water resource development potentials made by the United States Bureau of Reclamation(USBR) and funded by the International Cooperation Administration(ICA) in 1956 (Ref. 2). These studies together with other 1957 surveys, especially by U.N. agencies*, led to the formation of the MCC and set the stage for further investigations.

In 1957, with the support and cooperation of ECAFE, the four Mekong riparian countries established the MCC. This Committee, composed of one member from each riparian nation with plenipotentiary powers, has since worked to promote, coordinate, supervise, and control the planning and investigation of water resource development projects in the Basin. The Committee is supported by a technical staff, the Mekong Secretariat, which operates under the aegis of the United Nations in close cooperation with ESCAP, and which receives its core institutional financial support from the UNDP. Under the auspices of the MCC, numerous studies have been undertaken to explore development potentials for the Lower Mekong Basin and to designate specific areas meriting early investigation.

The earlier U.S. inputs were primarily limited to studies related to the planning of Pa Mong, a proposed mainstream dam and reservoir project located about 20 km upstream from Vientiane, and to the initiation of the systematic collection of essential hydrologic data throughout the Basin. Subsequently, in 1961 at the request of the MCC, the United States agreed to a USBR comprehensive feasibility study of the Pa Mong Project. The report of this study (Ref. 12), submitted in 1962, recommended that further consideration be given to the extent and quality of arable lands which might be irrigated from Pa Mong before proceeding with further engineering investigations. The report outlined a recommended program for investigations to be done in successive phases, assuming progressively favorable findings.

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* This includes the United Nations Technical Assistance Mission(UNTAA), headed by R. A. Wheeler (LT. Gen., USA, retired; generally known as the "Wheeler Mission".

Under a May 1963 project agreement with the MCC, the United States undertook Phase I of Pa Mong. Again, the investigations were carried out by the USBR in cooperation with the riparian countries, but primarily with Laos and Thailand, the more immediately affected countries. The Phase I project included geologic studies and exploration of potential mainstream dam sites and topographic mapping of the Mekong River and of certain tributaries for possible additional dam sites and reservoir locations. Also included was a preliminary study of electric power needs. The Phase I studies project report was issued in 1966 (Ref. 3). Principle findings were that sufficient land lay in the proposed benefit area to indicate an adequate potential for irrigated agriculture, and that both technical and financial aspects warranted further and more detailed investigation (to be known as Phase II). As a result, an agreement was executed in December 1965 between the MCC and the United States Government for additional studies, again under the auspices of the USBR. This led to preparation of the Pa Mong Stage One* report in 1970 and the Pa Mong Phase II report in 1972.

By 1970 the Mekong Secretariat had achieved institutional capabilities for sponsoring a much wider range of investigations in the lower basin. Accordingly, U.S. inputs were broadened to include a considerable number of non-Pa Mong planning investigations. Consideration was also given to capital projects ready for implementation/construction.

1.3 Goal of the U.S. Effort

1.3.1 Potential of the Mekong Committee/Secretariat

The broad goal of the U.S. effort has been to raise the socio-economic level of the peoples within the Lower Mekong Basin through increased cooperation among the riparian countries. The specific means has been through helping to create a regional institution, namely the Mekong Committee and its Secretariat (MC/S), capable of carrying out both water resource development studies and projects throughout the lower basin in cooperation with the riparian member countries and utilizing a maximum of riparian country personnel.

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* "Stage One" refers to the recommended initial development of the Pa Mong project. Steps in the series of USBR studies are referred to as "phases".

The basic concept outlined above was especially noteworthy for several reasons. First, trained local personnel participated as peers in the decision making processes, thereby assuring that the riparian countries in fact look upon the MC/S's activities as their own. Without such indigenous participation the proposals advanced by the MC/S could hardly be expected to be realized. Second, the transfer of technology raised the levels of technical capabilities within the riparian countries and decreased their dependence on external assistance in the form of expensive outside experts (as measured in professional man-months). Thirdly, the regional institution can work in close collaboration with the local governments without suffering from the many constraints inhibiting direct local government operations.

Thus, in summary, it can be said that, given a regional institution successfully constituted and operating on the pattern described above, it is posited that a great deal more progress can be accomplished in raising the socio-economic levels within the region by channeling funds through that agency rather than by direct operations with the individual countries. This was the vision of the U.S. in 1957 when assessing the potentials of MC/S and was the basis for the decision to support the MC/S as the most practical vehicle for achieving broad socio-economic development in the lower Mekong basin region.

1.3.2 Measurement of Goal Achievement

The key development which set the stage for implementing the MC/S concept was the approval by the riparian countries in March 1957 of a statute establishing the Committee. This statute stipulates that the Committee shall consist of one member from each country "with plenipotentiary authority to promote, coordinate, supervise, and control the planning and investigation of water resources development projects in the lower Mekong basin". This statute also empowers the Committee to "make requests on behalf of the participating governments for special financial and technical assistance and to receive and administer separately such financial and technical assistance and take title to such property as may be offered under technical assistance programs of the United Nations, specialized agencies, friendly governments, and other organizations". With this unique statute in hand, it was possible to obtain UNDP institutional support for the Secretariat's administrative budget to implement the Committee's program, and in turn for the Committee

to seek additional financial support from a large number of donor countries and other agencies as well as from the riparian countries themselves.

There are many evidences of the success of the institution and its work over the 20-year period under review (1957-77), beginning with the 69 meetings of the Committee, each of which resulted in substantial progress in terms of project initiation, guidance during implementation and completion of activities. Also, in parallel with the Committee, each country established its own National Mekong Committee to carry out liaison with the MC/S. Moreover, certain agencies of the member countries were delegated responsibility for implementation of special action programs authorized by the Committee. In Thailand, for example, the National Energy Administration was designated as such.

Because of the continuing growth of Committee activities (from 1957 to 1975), two special sub-committees were established: one on navigation (1961-64) and the other on agriculture (1971) to provide coordinated guidance in these areas. Also, an Advisory Board to the Committee was formed in 1959 and has met 24 times, giving the MC/S access to advice from a permanent group of high level experts with various national and professional backgrounds.

Perhaps the best index of MC/S success is the magnitude of financial resources realized. By the end of 1976 these had totalled some $355 million, including $206 million from thirteen UN institutions, the IBRD and ADB, twenty-five donor countries and a number of other agencies, plus $149 million contributed by the riparian countries themselves. (Details are given in Appendices 2 and 3).

Another impressive indicator of progress by the Committee was the adoption of a series of legal arrangements for harmonious development of their common water resources by the plenipotentiaries on behalf of their respective governments. The first decision on fundamental principles, made by the Committee upon its formation in 1957, concerned conservation of the regime of the Mekong mainstream during low flow periods. A further step was taken in 1964 when the Committee adopted two principles with reference to any bridge to be built across the Mekong mainstream: mainstream bridges shall not impede international waterborne traffic; and the Committee shall assist in obtaining the international financing for such structures.

The "Joint Declaration of Principles for the Utilization of the Waters of the Lower Mekong Basin", adopted by the Committee in 1975, constituted a remarkable innovation. The main objective of this Declaration was to ensure that conservation, development, and control of the water resources of the Basin be directed towards optimum utilization for the benefit of all the people of the Basin States.

A subsequent legal development was the preparation in 1975 of an MC/S draft for a proposed regional authority to be empowered to administer and manage international projects such as the Pa Mong complex.

Finally, it should not go unnoticed, as a measurement of goal achievement, that steady progress in the MC/S and the entire Mekong program easily permitted and facilitated corresponding progressive changes in U.S. policy governing U.S. participation in the activity (witness changing "Purposes" in the Logical Framework) through the period up to 1975.

Over the 20 year period of this evaluation, the U.S. contribution represented only 13 per cent of the total resources accumulated for Committee activities through calendar year 1976. In the early, critical and formative years that percentage was much higher. As the Committee's credibility, experience and reputation grew, however, the U.S. percentage of the total resources gradually dropped, although the annual volume of U.S. support increased markedly over the early years. In development terms, this evidence provides an effective index of project success. By providing the early risk assistance, the U.S. gave the Committee the time required to establish its bonafides as an effective mechanism for regional cooperation for development. Once established and functioning, the Committee was in a position to attract and utilize increased resource inputs by the riparian members and from the wider international donor community. While the events of the past two years have slowed down the rates of expansion and implementation, other donors continue to demonstrate their confidence that the Committee will withstand the temporary lull and ultimately resume the position that it occupied before the cessation of hostilities in Indo-China.

2. Period 1957-65

2.1 Purpose of U.S. Support

As noted in Section 1.3, the key to the entire U.S. regional approach to raising socio-economic conditions in the riparian countries was based on the assumption that the MC/S as an institution could, and should as soon as possible, build up a competent staff of riparians having expertise in the wide range of specialized fields necessary for water resources development. Building such a staff, however, involving numerous professional disciplines, is a long and complicated process. The U.S.G.'s early assessment of the needs concluded that the initial financial input should be concentrated essentially on creating Secretariat capability for basic hydrologic data collection and analysis.

Basic hydrologic data, namely statistically reliable information on the quantities of flow in the mainstream and major tributaries and variations of the flows throughout the year, plus supplemental information on bed load sediment carried by the streams and on stream water quality, is of absolute fundamental importance to any and all water resource development planning. Thus, the initial major U.S. supported effort, following a reconnaissance of the basin made by a USBR team in 1957 (Ref. 2), was a hydrologic survey of the lower basin (the Harza survey, 1958-62, Ref. 12). The Harza survey first confirmed the almost total lack of basic hydrologic information covering most of the lower basin despite the Mekong being one of the world's major rivers, and despite the vital importance of this information to basin resource development. Only limited data existed for small portions of the region, e.g., French stream gaging data accumulated in the Vietnamese delta. The Harza survey included installation and initiation of systematic stream gaging and related hydrologic data collection operations, thereby establishing a basis for a continuing program.

2.2 Output Indicators

The Harza survey produced systematic meas cements of discharge in the Mekong river and its major tributaries, beginning in 1959 (since then and on the basis of accumulated data, it has been possible to reconstruct historical flow data using stage records on established stage-discharge relationships).

The U.S. input into the basic hydrologic program accounted for most of the total MC/S financial resources allocated to this activity (as distinct from the riparian country contributions and the MC/S riparian country equipment installation program) over the 20 year period. In addition, the U.S. input for spare parts and replacements over the period 1957-74 amounted to $170,000. The latter U.S. grant was made in conjunction with France, New Zealand, Australia, Japan, The United Kingdom, The Netherlands, Hong Kong, India, the four riparian countries and the IAEA, UNESCO and the Asia Foundation. Basic hydrologic data collection and analysis was also part of the initial Pa Mong investigation carried out by the USBR from 1964-1970 (Ref. 2). Detailed information on the accomplishments for 1957-65 are given in Appendix 4.

Following the Harza survey a most significant step was the training program (1957-65) for approximately 100 technicians (Appendix 6). With the U.S. Corps of Engineers providing most of the instruction, the program included both MC/S and riparian country staffs.

Another step in the progress of the basic hydrologic data program was publication of the annual Hydrologic Data Yearbooks, initiated in 1962. These Yearbooks present all of the information now routinely obtained from the hydrologic and meterological stations of the system suitably compiled in two volumes: hydrologic data; and complementary meteorological information.

2.3 Continuing Development of Basic Hydrologic Data Program

The MC/S basic hydrologic data program has steadily evolved and continues to expand. As of 1976 the system included collection, evaluation, and publication of basic hydrologic and meteorologic data, and application of the data to specific needs of the overall Mekong Committee program for project development. The program now includes streamflow measurements from a network of 244 stations throughout the basin in both the mainstream and tributaries. One indication of the continuing importance the riparians attach to the hydrologic system is that during 1976 seven new stations were installed in Laos and nine in Thailand and both countries continue to report to the MC/S on a systematic basis. Streamflow measurements are made, when possible, at all stations and additional measurements are made at selected stations for sediment content (amount and particle size

distribution) and water quality characteristics. Stations in the delta zone are used for measurement of salinity. In addition, a complementary network of 277 meteorological stations is maintained, thus enabling statistical correlation of rainfall and runoff. The network includes four new stations established in Laos in 1976 and 11 in Thailand.

All this work has been carried out by the riparian governments with the MC/S providing technical guidance, equipment, and supplies, and in collecting, collating, and publishing the data on a basinwide basis. The MCC's activities have been guided by the Chief Hydrologists of the riparian countries, who, under MCC sponsorship, began meeting annually in 1969. The MCC has also sponsored a number of training courses on the technology of stream gaging and related subjects for riparian personnel (Appendices 4, 5, and 7). The total investment in the overall program, through 1975, is estimated at approximately $4 million of which the U.S. contributed approximately $3 million.

An assessment of the overall basic hydrologic data program, made as part of an evaluation of the environmental effects of Pa Mong (Ref. 7), confirms the adequacy of the existing program to meet the needs for planning and preliminary design of lower basin water resource projects. Also, another index of the value of the on-going basic hydrologic program is its key role in the MC/S flood forecasting program initiated with U.S. support in 1970 (Appendix 4 and Ref. 140), without which this activity would necessarily cease.

In summary, it is clearly evident U.S. inputs during the period 1957-1965 in the form of studies, equipment, training and advisory services were effectively utilized in the establishment of a functioning, basinwide hydrologic system. Further, subsequent and continuing demonstrations of competence on the part of the MC/S in the publication of Annual Hydrologic Yearbooks, thematic analysis of data, and the regular additions of new stations are all the evidence necessary to confirm the success of the now well institutionalized program.

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3. Period 1965-73

3.1 Introduction

In President Johnson's April 7, 1965 address at the Johns Hopkins University, he stated: "The vast Mekong river can provide food and water, and power on a scale to dwarf even our own TVA... For our part I will ask Congress to join in a billion-dollar American investment in this effort...". That speech and the U.S. initiative that resulted from it led the U.S., during 1965-73, from the initial, limited purpose of basic hydrologic data collection and related investigations to a very broad program, including: (a) numerous detailed studies and investigations covering many aspects of water resource development throughout the lower basin, and (b) investment in capital projects and/or feasibility studies or preliminary design work for specific projects. This new initiative involved a total U.S. investment of about $20 million for studies and $15 million for capital projects. Over this eight-year period, the MC/S through formal courses and on-the-job training, progressively increased its professional staff capabilities, and built up an enviable record of capability for initiation and in-house management of hundreds of study investigations and numerous capital projects.

3.2 Studies and Investigations

3.2.1 Purpose of U.S. Support

The MC/S institutional capabilities developed during the period 1965-73 included all aspects of technical skills needed for modern approaches to water resources project planning as indicated by the structuring of the Secretariat into four divisions: Engineering, Agriculture, Navigation, and Socio-economic Studies. These in turn include a number of special service units such as the basic hydrologic data unit, a systems analysis unit (in Engineering), a land use mapping unit utilizing satellite imagery methodology (in Agriculture), a fisheries unit (in Agriculture), a Planning Unit (since 1973), and an Environmental Unit (1976). The professional disciplines involved include civil engineering (especially hydrology and water resource project design); agricultural research and development (soil science, agronomy, etc.); fisheries biology and technology; socio-economic evaluations (sociology, economics, statistics, resettlement issues); public health specialists (malaria, schistosomiasis, other water-oriented diseases and community public health related facilities); hydrography and river navigation; agro-industrial development; mineral development; and ecology.

As of March 1975 the Secretariat had a total in-house staff of 69 professionals, including 46 from the riparian countries (11 each from Laos and Cambodia, and 12 each from Thailand and Viet-Nam), and 23 from outside countries, including two from the U.S.

3.2.2 Output Indicators

An indication of the MC/S institutional capability during the 1965-73 was the Mekong Committee's list of studies and reports published during this period (Ref. 6). Included in the listing are a total of some 1,100 reports on discrete study investigations (as distinguished from general publications such as annual reports. Among them are special reports produced by the MC/S staff (in collaboration with the riparian governments) and a lesser number produced by outside contractors or in collaboration with affiliated UN agencies, donor countries, or others. The total cost of study investigations over the 1965-77 period is estimated at about $75 million (Some $23 million more was invested for such investigations in the 1955-65 period).

As previously noted, the U.S. contribution for 1965-73 amounted to approximately $20 million, $14 million of which was in support of the Pa Mong project. This choice by the U.S. stemmed from the recognition that (a) the primary mission of the MC/S was(and continues to be) the promotion of international projects for water resources development of the Lower Mekong River, and (b) that by far the most important project, and the first mainstream dam project which should be implemented, was Pa Mong. This choice grew out of Pa Mong's strategic location in the upper portion of the lower basin where an excellent dam site is available with potentially great power generation capacity, where the hydrology is favorable for sufficient storage to satisfy downstream irrigation potentials, and where the effects on the ecologically-sensitive estuarine-marine regions of the Mekong delta are reduced to manageable levels or are non-existent.

In view of the above, the U.S. contribution during this period was devoted mostly to (a) engineering feasibility studies to evaluate the type of dam project best suited to the conditions including mapping, geologic investigations, and civil engineering design, and (b) to determine the extent of power generation necessary to meet anticipated market requirements, irrigation potentials in northeast Thailand and Laos, and related preliminary evaluations of agricultural cropping potentials, fisheries, navigation, public health, channel degradation, socio-economic surveys, and resettlement. The bulk of this work was included in the Pa Mong Stage One report (USBR, 1970) and the Pa Mong Phase II report (USBR, 1972). Much of the same basic

information developed from these studies also contributed to preparation of the Indicative Basin Plan (1970), which summarized all MC/S concepts relating to water resource development throughout the basin and to which the U.S. contributed some $460,000. In addition to the three main reports noted above (Pa Mong Stage One, Pa Mong Phase II, and the Indicative Basin Plan), a number of specialized reports on U.S. supported Pa Mong related studies were published such as socio-economic bench mark surveys and preliminary resettlement studies.

Another significant project for the 1965-73 period was full development of the Mekong River Flood Forecasting program. This program provides daily radio alerts from the MC/S (Basic Hydrologic Data Office) to each of the riparian countries advising them of anticipated flood hazards along the river. These flood projections are made using the Streamflow Synthesis and Reservoir Regulation (SSARR) computer model, originally developed by the U.S. Corps of Engineers for the Columbia River basin analyses, but modified to suit the Mekong River situation using hydrologic and meteorological data furnished daily by the riparian countries to the Secretariat. This program, with continuing assistance from the Corps of Engineers, was experimentally initiated in 1968 and by 1970 was considered sufficiently valuable to warrant establishment as a regular operation with continuing refinements each year.

In support of the numerous studies and related operations developed over the 1965-73 period, the Secretariat was successful in establishing competent programs in systems analyses, in basinwide mapping (using conventional techniques), and in use of satellite imagery in further mapping and basic data compilations.

The systems analyses programs use computer facilities already in Bangkok, including those operated by the Thai Government and the Regional Computer Center at the Asian Institute of Technology. As a result, an impressive array of computer models tailored to specific projects have been developed (See Appendices 12-A and 12-B). These include the SSARR, Hydro System Seasonal Regulation(HYSSR), and HIGHHEAD programs for hydrologic and related power generation analyses along the river system, the DELTA model and TIDAL models for hydrologic analysis in the Mekong delta, the Wien Automatic System Planning(WASP) package for fossil fuel/nuclear power alternative analyses, the CSHFLOW model for economic studies, and the Mekong Agricultural System Simulation(MASS) model for analysis of irrigated farming practices. This modeling program enables the overall MC/S program of water resources development to be judged by knowledgable observers as one of most advanced anywhere in this field.

The early(1961) joint U.S./Canadian work of leveling and ground control of the Mekong river from the Burma border to the sea provided a firm basis for the MC/S's expanded basinwide mapping program using the technology available at the time. Subsequently, more modern techniques utilizing remote sensing data, derived from both aerial and satellite imagery programs, permitted further refinements and the development of additional thematic maps and initial spatial configurations.

Because of the vast size of the lower basin and the complex nature of the MC/S's planning activities, the MC/S became one of the original group of NASA collaborators (subsequent to the launching in 1972 of the ERTS-1, now called the LANDSAT-1 satellite) in establishing a satellite imagery mapping program. The program continues to develop and has already furnished a wealth of information in such areas as soils, forestry, land use, flooding, and geomorphology. To analyze the imagery, false-color composite techniques are used, with the help of a projector-viewer for color-composite reconstruction, and with color transparencies processed from diazochrome proofing films. LANDSAT imagery has made it possible for the first time to observe and analyze the entire lower basin from a set of homogeneous maps. Moreover, sequential coverage makes possible the study of cyclical characteristics and phenomena, from which the Secretariat has produced a number of thematic maps. These include maps showing (a) vegetation, (b) land systems, which combine physiographic, geologic soils, and hydrologic characteristics as recurring units, and (c) flood and drainage conditions during consecutive periods. Illustrative examples of this work are given in Reference 7 (Chapter III, Figures 2, 3, and 4).

3.2.3 Inputs

The U.S. inputs for study activities included funding support and technical assistance to the Secretariat's programs in training, studies and investigations, basic data collection and application as noted in the matrix for the 1965-73 period (for studies). Inputs also covered the direct operations of the USBR in preparing the Pa Mong Stage One report (1970)(Ref. 4), dealing primarily with the Pa Mong dam and reservoir project (but with limited attention to irrigation), and the Pa Mong Phase II report (1972)(Ref. 5), including preliminary planning for a comprehensive system of irrigation in the Pa Mong region of northeast Thailand and Laos.

3.3 Capital Projects

During the period 1965-73, the U.S. initiated financial support for capital projects, especially the grant contribution of $13.5 million (half the total cost) for construction of the Nam Ngum I project in Laos. It should be noted both in reference to Nam Ngum I,

and the Mekong Pioneer Agricultural projects, that the U.S. offer of assistance was critical to obtaining other international financing. With specific reference to Nam Ngum I, the U.S. offer to grant-finance up to 50 per cent of the total costs lightened the task of obtaining full financing for the project. Without this offer it is doubtful the project would have been achieved. Further, the Nam Ngum I project was the first real demonstration of the benefits of international cooperation between the riparian countries. Since the commissiioning of the project in 1971, the production and sale of power has continued without interruption with great benefits to both Laos and Thailand. For, in addition to helping to meet the foreign exchange needs of Laos (much of which is again spent in Thailand), reservoir fish production, hardly envisioned at project inception, has proven to be of almost equal value.

Because of the success of the Nam Ngum I project, the Nam Ngum II extension is now underway: increasing the power generation capacity from 30 mw to 110 mw and the size of the fishery through greater impoundment. The U.S., which initially made a loan of 5 million towards the total estimated cost of $40 million for Nam Ngum II, was forced to withdraw from participation in the Nam Ngum II fund due to the Congressional prohibition (See 109, P.L. 94-41, dated 27 June 75) against continued aid to the Indo-China countries. Fortunately other donors, primarily West Germany, were prepared to make up the shortfall.

The Nam Ngum success story is of special significance because the proposed Pa Mong project may be regarded in many ways as a large-scale project of the same type: with firm prospects for realizing the same local and international benefits for both Laos and Thailand on a relatively large scale, and with significant benefits (through low-flow augmentation) to Cambodia and the southern part of Viet-Nam as well.

In addition to participation in financing the Nam Ngum project, the U.S. inputs on capital projects included participation with the UNDP, Japan, the United Kingdom, and The Netherlands in the initiation of another major "milestone" project, namely the Pioneer Agricultural projects. These projects involve implementation of some 14 full-scale agricultural communities at locations throughout the basin. The key objective will be proving and demonstrating the viability of proposed massive-scale systems of irrigation, including that expected to result from Pa Mong. It must be recognized that this concept will mean virtually complete reorientation of the traditional rural village socio-economic patterns characteristic of the lower basin: from a system oriented to simple rainfed rice

monoculture (essentially a part-time job), to year-round rainfed/irrigated agriculture using modern technologies (equipment, agricultural chemicals, diversified cropping patterns, etc.). Such changes will require extensive farmer cooperation in joint use of irrigation water, maintenance of irrigation systems, use of agricultural chemicals, storage and sale of produce, and of course financing, plus implementation and management of the anticipated upgraded community infrastructure (implementation of four of the programmed projects was curtailed in 1975-76 but is now again underway).

The purpose of the Pioneer Agricultural projects is to demonstrate that vast socio-economic transformation can be accomplished in a realistic way. For example, the transformation may be achieved by starting with community irrigation units small enough to be readily managed and monitored, yet large enough to represent full-scale levels of activity. Thus the individual projects range from 2,000 to 20,000 ha and affect 2,000 to 50,000 people per project. These projects are expected to be implemented over time periods of 3 to 10 years. With the lessons learned, each of these centers can then be considered a nucleus of experience which may be expanded with confidence on a progressive, massive scale throughout each projects hinterland. Appendix 8-B illustrates the current status of the program of pioneer projects, and notes that preparatory studies have been completed for all of the projects.

In addition to the Nam Ngum I and the Pioneer Agricultural projects, U.S. assistance included; (a) participation in feasibility studies for the My Thuan bridge ($100,000) in the Vietnamese delta near Can Tho (Ref. 142), and a pledge of $5 million toward construction (later withdrawn), (b) funding of a substantial navigation improvement program along the Mekong river (primarily construction of ferry and cargo handling ramps and rock blasting at Keng Kabao for removal of channel obstructions)(Ref. 144 and 158) (c) support for the preliminary design of a diking system to protect Vientiane from frequent flooding (Act. 145), and (d) establishment of a reservoir fishery program at Nam Ngum (Ref. 41, 42, and 43), and other like projects. Details are given in numerous MC/S publications (Ref. 6; also see list of references, Appendix 1).

3.4 Evaluation of Project Performance for the Period 1965-73, Institutional Maturity

Whereas the MC/S was still heavily dependent on foreign technical and administrative expertise (including contracting capability) in 1965 for carrying out other than basic data collection and analysis activities, by 1973 this institutional failing was all but eliminated. Indeed, the MC/S itself, as demonstrated by MC/S assistance being rendered to international organizations, non-riparian governments, agencies and water resources programs outside the Mekong basin, was by 1973 internationally recognized as a reliable source of water resource development methodologies. The program had grown to encompass all recognized aspects of water resource development and contained rapidly growing numbers of research activities requiring on-the scene conceptualization and initiative; that is, no longer could the MC/S simply apply adapted, proven technology and administrative techniques developed elsewhere in the world, but must and was fully launched on its own pioneering, research program.

Further, completion of the Nam Ngum I activity and initiation of Nam Ngum II were clear demonstrations of the MC/S's capability to guide to fruition a highly complicated international effort: the primary basis for the MC/S's existence and previous U.S. support. Thus, the change in U.S. policy, as noted in Section 4 which follows, is, in itself, the best evaluation of U.S. assistance for the period.

4. Period 1973-78

4.1 Purpose of U.S. Support

The purpose of U.S. support for the period was to facilitate implementation of jointly planned and selected capital projects. While the MC/S program of studies continued at its highest level over 1973-75, the U.S. interest during this period was again re-orientated, this time almost entirely toward capital projects in order to take full advantage of previous progress. And, while actual capital project activity during the period was still limited to work on implementation of only three projects, Nam Ngum II, ports and cargo, and Pa Mong, proposals had been or were also being developed for numerous other projects requiring an additional U.S. investment of approximately $100 million (Appendix 9).

4.2 Nam Ngum

As noted earlier, the outstanding success of Nam Ngum I, in addition to its inherent benefits, also demonstrated the feasibility of international cooperation on such projects in the lower basin. Thus, the decision came in 1973 to proceed with the next stage of the project (Nam Ngum II), with the Japanese picking up half the cost this time, and the decision to reorient the U.S. contribution almost entirely to like activities. Included therein were further efforts on Pa Mong.

4.3 Pa Mong

Subsequent efforts on Pa Mong stemmed from the growing recognition that this project is literally the key to the entire MC/S program of comprehensive water resources planning and development for the lower basin. By 1973 it had become apparent that Pa Mong would be by far not only the largest and most influential project in the Mekong program, but was clearly the first mainstream project which should be implemented. It alone could make huge contributions to meeting power, irrigation, and food requirements of the entire basin. Consequently, it was decided to proceed with the Pa Mong Optimization and Downstream Effects study which, building on the earlier reports (1957-73), would present all the hard data and conclusions necessary to permit final decisions at the necessary political levels to proceed with final design and actual construction.

Although included in the 1972 USBR report was tacit recognition of substantial downstream benefits from Pa Mong, no detailed study was made of the actual magnitude of such benefits except for a cursory examination of flood control, nor of their significance to the downstream countries of Cambodia and southern Viet-Nam. Moreover, the USBR study considered Pa Mong as more or less an isolated project without taking into account the increased benefits that would accrue if it were operated as part of a co-operative system with other downstream projects such as Stung Treng and Sambor.

The main issues to be addressed in the Pa Mong Optimization Study included; (a) establishment of an optimum dam height, (b) proper management of the large-scale resettlement problems anticipated from Pa Mong construction, (c) the downstream effects of the project, and (d) protection of valuable environmental resources of the basin. Earlier studies indicated the most desirable project would likely result from a reservoir pool height of 250 m MSL and indicated a feasible range of high pool levels from 230 to 260 m MSL. Consequently, in 1973, the U.S. made financing available to the MC/S in the amount of $1.1 million (over the period 1973-77) for the study. It is significant that this highly important project, involving application of the most sophisticated technologies, was carried out essentially as an in-house project with relatively few U.S. or other outside experts. Also significant was the recognition given to the two very sensitive issues of resettlement and of the environmental factors, especially fisheries. The resettlement issue is particularly sensitive, both because of the magnitude of the expected number of people to resettle, and because in no developing country to date has this issue been handled, in our estimation and as supported by currently available literature, satisfactorily for a major dam/reservoir project of this magnitude ($1.5 billion).

The potential impact of Pa Mong on fisheries was a major concern because of the essential role of fish in the diet of region, and because of the apprehensions that the project, by altering the hydrologic regime of the river, might seriously impair the main fishery resources in the lower basin (the final report of the study, delivered in 1976, confirmed that the Pa Mong project plan can be expected to enhance fisheries, if properly handled, in all of the four riparian countries involved - rather than detract from them).

4.4 Additional Project Proposals

As previously noted, in addition to the capital projects described above, the period included development of numerous capital project proposals designed to take advantage of the many feasibility studies which had by then been completed. The U.S. proposals for the 1973-78 period included: (a) participation in a group of pilot fish farms (located in all four riparian countries) designed to take advantage of proposals originally conceived in the USBR Pa Mong Phase II report, i.e., greatly enhancing fish production in the lower basin by use of fish ponds so located as to take advantage of year-round supplies of water available from irrigation systems and using modern aquaculture techniques tailored to management of the pond systems by family cooperative enterprises (Ref. 5), (b) final design of the Pa Mong project, including the dam itself, in anticipation of a decision to proceed with the project, (c) participation in implementing some of the Pioneer Agriculture projects and a number of chosen multi-purpose tributary projects.

In summary, this period may be termed the period of "great expectations", when MC/S activities were at their highest level in terms of both studies and capital projects. The fruits of the entire work program since 1957 were about to be realized.

5. Period 1975-77

5.1 Outputs

The cessation of U.S. involvement in Indo-China in mid 1975 resulted in the Congressional decision to discontinue any new U.S. input for development in the Indo-China countries. Thus, the U.S. interest in the 1975-77 period was subsequently adjusted to focus on maximizing returns from investments already made or committed via completion or termination of U.S. participation in individual MC/S projects underway in the Secretariat itself or geographically located in Thailand.

As listed in the matrix, some 12 different MC/S sponsored studies or projects are included in this category (several others were in process but unaffected). A review of the more important of these, scheduled for completion by end of CY 1976, is as follows:

5.1.1 Pa Mong Optimization and Downstream Effects Study

The main report of this project, now being reviewed by the special "Australian Snowy Mountain Team" is scheduled to be completed by 1 March 1977 with achievement of practically all of the objectives

despite the disrupting attrition of Secretariat riparian staff. An indication of the magnitude of the total effort involved in the Pa Mong Optimization and Downstream Effects study may be obtained by estimating the total number of pages of text, tables, and drawings to be included in the main report, working papers, and key supplementary reports, i.e., estimated at not less than 16,500 pages of materials. This estimate does not include the large number of additional reports on studies sponsored by the Mekong Committee for other purposes which, nevertheless, contributed very significantly to the project.

Another indication of the magnitude of the total project effort is the estimated input of professional skills involved. This is estimated to total approximately 26 man-years of Mekong Secretariat staff, plus approximately 68 man-years of input from foreign and local consulting firms or governmental agencies conducting contract studies directly related to the project.

Of the many working papers and supplementary reports, many have potential use throughout the region beyond the interests of the Pa Mong project, including a comprehensive evaluation of the environmental resources of the area and of their predicted impact under other project conditions (Ref. 7), the first quantified assessment of fishery resources throughout the basin (Ref. 11), the resettlement planning and costing study (Ref. 10), further Schistosomiasis studies, and a major contribution toward developing a comprehensive plan of agricultural development in the lower basin. Also, the basic mapping of the area of the Stung Treng project (which, along with Pa Mong and Sambor make up the primary system of mainstream projects) was completed as part of the overall Pa Mong Optimization and Downstream Effects project. The Stung Treng work included a seismic survey and core drilling on the proposed dam axis, preparation of topographic maps (5 m contour intervals) of the vicinity of the dam and reservoir, and storage computations.

5.1.2 Schistosomiasis Control Operations

Following completion of the Smithsonian study report in 1974 (which in itself represented the first compendium on waterborne diseases in the lower basin, Ref. 129), a program of further study and engineering operations for demonstrating control of this hazard at Khong Island in the Mekong river was initiated. Unfortunately, events intervened and there was no possibility of completing the engineering portion of the program in the near future. Thus, this portion of the program was terminated prior to initiation (See Section "e" for discussion of continuing schistosomiasis studies). Work in Thailand in the Mun and Chi Tributaries was continued to completion (See 5.1.5 below).

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5.1.3 Navigation Aids on Mekong River

The final ramp and cargo handling facilities were constructed at Chiang Khong, Thailand in 1976, thus completing this program. Included in the program were 9 such completed works at a total cost of $484,000 (ref. 143). The most critical portions of the rock blasting program for river channel improvement were completed (Ref. 144) during 1975-76 . While the overall MC/S program in navigation is both long and short range, the U.S. supported activities have been primarily focused on, and have been successful in achieving, immediate benefits.

5.1.4 Other Capital Projects

These were (1) the delta water control rehabilitation feasibility study (which was made in preparation for rehabilitation of war-damaged canals, irrigation systems, and other works)(Ref. 14); (2) completion of procurement orders for spare parts for the basic hydrologic data program; (3) termination of U.S. participation in the My Thuan bridge project in the delta, and (4) withdrawal of U.S. participation in the Nam Ngum II project (Ref. 161).

5.1.5 Study Activities

While the 1975-77 inputs focused on capital projects, it also included completion of outstanding on-going study activities not capital-oriented. These represent (1) partial completion (about 10 per cent) of the delta soils management study, initiated in 1974 with the objective of determining the best methods of multiple cropping on heavy clay delta soils under proper conditions of water control (Ref. 148); (2) completion of the agro-industrial study (Ref. 90) on the use of kenaf for making pulp and paper (this contribution has proven to be most timely as the establishment of a major manufacturing plant (private sector) is one of the current top priority items being considered by the Thai Government); (3) completion of initial exploratory drilling for potash in the Khorat plateau in northeast Thailand and Laos which has given extraordinarily promising results indicating the potential for a vast new industry to meet the requirements for potash fertilizer throughout Asia, and which could be of great benefit to the poverty-stricken area of northeast Thailand (Ref. 120); (4) completion of an ecological study of Nam Ngum reservoir in Laos, which produced rare basic data on reservoir ecological phenomena in a tropical

region while further providing information useful in planning for management of the Pa Mong reservoir for maximum fish production and conservation of reservoir wildlife and water quality (Ref. 153); (5) completion of a study for evaluating the applicability of the MASS model for analyzing the economics of irrigated agricultural practices, including effects of irrigation, agricultural chemicals, diversified cropping, etc., representing a valuable step forward in the development of this methodology (Ref. 64, 191); (6) completed assistance to the Mekong Committee for the draft to establish a legal agency for management of international projects such as Pa Mong (Ref. 193); (7) completion of computer processing of satellite imagery tapes to be used in continuing Secretariat thematic mapping activities, and (8) termination of the schistosomiasis study activities growing out of the Smithsonian report of 1975, namely the appraisal of ecological parameters governing the snail vector and their relationship to Pa Mong - ($300,000), and monitoring of current disease incidence ($50,000) (these activities were only about one-third completed, with no opportunity for full completion, except for a shortened University of Lowell contract study, when terminated).

Despite all effort to meet the December 31, 1976 target date for the completion of all U.S. supported activities, some slippage has been experienced; but still only one activity (resolution of a dispute between the Dooley Foundation and the MC/S over contract close-out costs - total funds involved of US$20,000) will remain incomplete by end-April 1977 (see page 1 of PAR for activities remaining as of December 31, 1976 and Appendix 18, audit report). Primary reasons for the slippages that have occurred are beyond the control of the MC/S examples being late delivery of computer program tapes from the International Atomic Energy Agency and the University of Michigan Resettlement Report.

The trauma of the Indochina aftermath to the contrary notwithstanding, the conclusion is reached that all U.S. inputs have been accounted for without exception. Those inputs were utilized and managed in extraordinary fashion to produce results only minimally short of those originally conceived, and in some cases for beyond expectation (discovery of potash, break-through on schistosomiasis).

5.2 Inputs

Completion or phasing out of U.S. activities involved approximately $1.4 million in residual U.S. funds (not counting the $5 million withdrawn from Nam Ngum II and cancellation of the $5 million My Thuan bridge pledge). In addition to the actual products described in Section 5.1, the funds covered completion of training courses in hydrology for riparian country personnel (1975)(Ref. 155), a training conference on utilization of satellite imagery for both Secretariat riparian staff and riparian country staffs (Ref. 194), and special consultant inputs from the Corps of Engineers on the Pa Mong optimization study and on flood forecasting.

5.3 Evaluation of Project Progress for the Period 1975-77

Events in 1975 in the Indochina countries dictated yet another, but immediate, change in U.S. policy. After a series of expeditious legal reviews, taking into account the nature and form of the U.S. commitment and its status and Section 109, 1961 F.A.A. as amended in 1975, a further project-by-project review of all Mekong activities receiving U.S. assistance was conducted and individual courses of action established for each activity. For the most part, this required extensive reprogramming on the part of the MC/S, with RED assistance, and the success of the effort is available for all to see in the form of completed construction (Thailand only - except for Nam Ngum II, the U.S. commitment being supplanted by other donors prior to actual U.S. withdrawal) and studies. For those projects toward which U.S. funds had already been obligated, but project initiation had yet to begin, the MC/S readily submitted full refunds to the U.S. Government. In the case of those projects or activities underway (3) wherein it was clear the projects could not be completed, or at least for some time to come, appropriate refunds were submitted by the MC/S in an equally responsible manner.

All other remaining activities were re-scheduled for completion prior to December 31, 1976. Considering that a number of three year projects were squeezed into two year time frames, and with the indulgence of a number of contractors and with no additional funds, the full or nearly full completion of these undertakings as originally planned is highly commendable. Indeed only 2 of the many projects in process failed to demonstrate adequate returns on the expended U.S. investment therein.

6. Summary and Conclusions

(a) The record of performance of the MC/S over the 20 year period 1957-77 is remarkable in demonstrating the validity of the initial U.S. hypothesis, made in the late 1950's and reiterated in the 1960's, that long-term investment in the MC/S institution to help build up its riparian staff and capabilities, with a minimum number of outside experts, could be one of the most productive vehicles for raising the socio-economic levels of the riparian countries and people. This is indicated for example, by the very impressive strides made by the MC/S in basic resource planning throughout the lower basin (See Conclusion "c"). As a result, significant follow-up socio-economic improvement activities have been initated in individual riparian countries, including areas in these countries not within the basin (See Conclusion "d"). This approach is not only economical in terms of the costs of expertise, but results in intimate involvement of riparian staff at all levels of project conception decision-making and execution while still maintaining the needed outside inputs. Hence, it offers a much better opportunity for follow up operations in individual riparian countries. Also, there seems little doubt that the international status of the MC/S institution has provided it with latitude for objectivity that would not have been possible without international influence.

(b) By about 1970 the MC/S institution had reached a level of competence which enabled it thereafter to manage a wide diversity of study and planning activities, together with construction projects, involving annual budgets of millions of dollars and the use of the most sophisticated methodologies. The credibility of the institution is most easily seen by its success in securing financial resources which, by the end of December 1976 totaled approximately $355 million, including $98 million for planning studies and $257 million for capital projects. It is also demonstrated by the fact the bulk of these contributions were made under terms which permitted the MC/S maximum latitude in their utilization.

(c) The list and descriptions of the completed activities are impressive not only for the number of studies and projects in a wide range of activity, and for their successful management and quality of products, but for their comprehensive approach to fundamental planning for development of lower Mekong basin resources covering many key areas of planning. For example, the MC/S has

produced the first systematic evaluations of the basin's resources and potentials in agriculture, agro-industrial development, forestry, wildlife, navigation, fisheries, water borne diseases, socio-economics, mineral development (including regional photogeologic mapping in Laos), and environmental resources, as well as ground and surface water resources (See Appendices 8-A, 8-B, 8-C, 12, 13, 14, 15, 16, and 17).

Another significant contribution by the MC/S was preparation of a detailed inventory of promising water resource development projects in the riparian countries outside the lower Mekong basin (Ref. 163), which should prove of considerable value to the riparian countries in developing their own comprehensive national resource development plans. It is believed this has been possible because the mission of the MC/S is essentially project oriented, thereby bringing its staff into more intimate involvement with resource use planning than is possible with more abstract and politically sensitive approaches. Needless to say, these contributions, because they analyse the resource situations in terms of both with and without international project conditions, will be of great continued use to the riparian countries for in-country development planning even if no international projects are ever realized.

(d) Examples of MC/S activities stemming from U.S. support that have provided or promise significant socio-economic improvements in the riparian countries include: (1) benefits from Nam Ngum power generation; (2) fish production in the Nam Ngum (Ref. 199) and Nam Pong (Thailand) reservoirs; (3) the development of small-scale (50 hectare) fish farms leading to more modern family oriented fish and aquaculture activities supplementing fish cage (Ref. 195) and high quality shrimp pond cultures (Ref. 156 and 200), all growing out of the Pa Mong Phase II Study; (4) the first in depth and comprehensive evaluation of agricultural potentials in the Mekong Delta, now being completed, by the Netherlands Delta Team (which, among other things, clearly demonstrates the vast increases of land-under-irrigation possible through low flow releases from the proposed Pa Mong dam); (5) contributions to public health through malaria and pioneer schistosomiasis programs; (6) riparian recognition and better management of resettlement problems (Appendix 17 and Ref. 184); (7) mineral exploration and resource compilation efforts (Ref. 201, 202 and ADB recently-approved $350,000 grant to RTG for rock salt/soda ash/potash development study); and (8) some 20 agro-industrial investigations and a regional workshop stimulating, among other things, fruit and vegetable canning and a paper-pulp-from-kenaf complex.

(e) Of the total $355 million resources generated by the MC/S over the 1957-77 period, the U.S. share is approximately 13 per cent (See Appendices 2 and 3 and Figure 1). The impact of U.S. assistance, however, has been far more profound than is indicated by these numbers in that (1) the U.S. input served as one of the main catalysts for establishment and implementation of the MC/S institution at the outset in 1957, (2) the U.S. input to planning studies has focused on key resource aspects of basinwide planning (e.g., basic hydrologic data, socio-economic levels, and fisheries), and on the most sensitive, and thus the most difficult, development issues (resettlement and environmental effects); (3) the U.S. input on planning also included major financing of the Indicative Basin Plan (1972) which represents the first comprehensive compilation of all water resource planning data throughout the lower basin, and which has since served as the principle guide for the planning of many projects within the riparian countries, and (4) the U.S. input on capital projects has not only been focused on perhaps the most meaningful capital project efforts thus far achieved by the MC/S, but has served as a catalyst to encourage financial participation by other donors (for example, Nam Ngum and Pioneer Agricultural projects) and has stimulated many additional studies in support of Pa Mong such as the delta agricultural planning undertaken by the Netherlands Delta Team and the MC/S study (supported with Japanese assistance) for evaluating the effects of Pa Mong flood control on downstream agriculture in Cambodia demonstrating that land reclamation resulting from flood control would very significantly enhance the total agricultural productivity of that country.

(f) An important result of the expanded Pa Mong investigations carried out by the MC/S, which are all compiled and evaluated in the Pa Mong Optimization and Downstream Effects report (Ref. 8), is clear recognition that the Pa Mong Project is critically needed to support the growing populations of the lower basin. The report indicates that this is the most practical approach to meet the minimum needs for energy and food by the year 2,000, and that construction of the project must be started soon if it is to be ready in time to meet the minimum food needs of many millions of people (especially in the northeast and central basins of Thailand). The irrigation benefits from the Pa Mong project could make it possible to produce enough food to support some 25 million people.

in northeast Thailand, an equal number in the Vietnamese delta, and about half as many in the central basin of Thailand, together with substantial improvements in agriculture in Cambodia, all subsidized by power revenues. In addition, the Pa Mong project could enable additional irrigation to produce large quantities of food for export; in fact there appears to be a real potential for the lower basin to become an important world "breadbasket".

(g) The U.S. efforts in support of the MC/S institution involved support of both formal training courses and in-house technology transfer through on-the job association between the MC/S riparian staff and the participating American experts. While many U.S. Government agencies have participated, the primary inputs have been made by the USBR and U.S. Corps of Engineers, including a "twining" arrangement which has permitted continuing close cooperation between the North Pacific Division of the Corps of Engineers and the Secretariat. Moreover, the participation of these two prestigious water resource development agencies has added substantially to the professional stature of the overall MC/S effort.

(h) One of the final conclusions of the evaluation team is that the fundamental concept of utilizing a regional institution like the MC/S for raising socio-economic levels in the developing countries, has worked very well in this instance, and that AID should give consideration to further use of this concept in other regions of the world as appropriate. Note that the MC/S institution combined essential characteristics: (1) plenipotentiary powers for the regional authority, (2) continuing support for the core institution budget from an international agency, (3) a broad base of international support for supplementary funds, and (4) specific projects to work upon as opposed to abstract assignments.

(i) It is important to note that MC/S publications and releases of the MC/S covering the entire 20-year period have given full recognition and credits to the contributions of all participants.

(j) With respect to the administrative aspects of U.S. support to the MC/S, two conclusions were made: (1) Beginning in 1969, and with but few exceptions, the U.S. Government through RED moved to obligate all funds to the Mekong program via simple Letters of Agreement-(LOA). As only essential statuatory guidance was contained in the documents (such as a very brief description of the activity or reference to a MC/S project document; amount of funds being obligated;

final dates for sub-obligation, expenditure, and refund of any unexpended balance and submission of reports; and audit and contract approval rights and source and origin requirements), they rarely exceeded 3 or 4 pages in length. The advantages of this simple procedure can not be overstated. Each LOA was specifically tailored to the project and the terms of the agreement easily amended to keep abreast of the activity. The benefits of this system were soon recognized by other donors to the MC/S, and led in many cases to even greater simplications in their own documentary procedures. In summary, the use of the LOA proved to be a more efficient procedure for the obligation and monitoring of U.S. contribution to the activity than other means available. (2) For various on-the scene reasons, several attempts were made to support individual projects with U.S. funds made available from both regional and bilateral U.S. sources. While in most instances the activities progressed approximately as planned once initiated, initiation was inevitably delayed, and for this and other reasons, the projects clearly suffered heavier costs than if the total U.S. contribution had been handled through a single office.

7.1. Current Status of the MC/S and its Program and Recommendations

7.1.1 Current Status

The Committee, now considered to be composed of the Lao PDR, Democratic Kampuchea, Thailand and the Socialist Republic of Vietnam, has been unable to meet since March of 1975(New Delhi); the reason being the absence of Cambodia and the Lao and Vietnamese desire that representatives from all four member states attend. Thailand seems willing to proceed with the program under whatever scenario can be arranged, but the Khmers appear to be, as of this writing and to the best of our knowledge uninterested, hesitant, or simply not yet ready to participate in activities of this nature. Without a meeting, the Executive Agent, and thus the Secretariat, has no authority to initiate new projects. The MC/S can however continue, and even expand to a certain extent, those activities which were previously authorized by the Committee and has managed, within the overall framework of that programme, to help obtain purely bilateral assistance for new activities in member states upon specific requests by the particular state involved. Some such new activities are now being initiated in Laos and Thailand by the MC/S.

Currently obligated 5-year plan UNDP support for the activity expires as of December 31, 1977. Prior to that date the UNDP will need to indicate its interest or non-interest regarding additional assistance to support the Bangkok based Secretariat. Other donor support, in terms of both project and MC/S operating costs, appears promising, but, nevertheless, a wait-and-see attitude is still evident among most donor and potential donor countries.

A Mekong session is normally held concurrent with the ESCAP Plenary and the next scheduled meeting is imminent, April 26, 1977, in Bangkok. In addition, under the annual rotational chairmanship procedure, Vietnam would normally assume the chair. As of this writing we are not aware of Vietnam's intentions regarding either the ESCAP or MC/S meetings.

As suggested, the MC/S is still active in both Thailand and Laos and MC/S and representatives of Vietnam have visited the MC/S more than once. Indeed, MC/S activities in Laos have been growing in both numbers and magnitude and, barring any unforeseen events, may well continue to do so. At the same time, work progresses

steadily in Thailand, where MC/S assistance has never ceased,

The sudden exodus of significant numbers of Cambodian and Vietnamese MC/S staff in 1975, followed by occasional departures in 1976, only some of which have been subsequently replaced, makes it unlikely that the MC/S could carry out a renewed and extensive program without additional expatriate expertise. The present staff can clearly continue to manage those projects still in-process and initiate/implement additinnal ones to a certain extent. However, should the scene be cleared of inhibiting factors, and donor and host country support materialize as might then be expected, an expansion of Secretariat staff would then, undoubtedly, be mandatory in order to maintain the same degree of professionalism and responsible financial accountability as in the past and at present.

In summary, and in our estimation, the MC/S is clearly capable of managing its present program, assuming no future reductions in staff below that now on-board and with continuing UNDP and other donor support, and some additional projects and activities. Any additional reductions, however, no matter how small, may well bring about the demise of the entire MC/S and its program. On the other hand, any significant increases in the scope of the present program would present an urgent need for commensurate training and recruitment of additional riparian state nationals and foreign advisory services at the MC/S.

7.1.2 Recommendations

A. Assuming favorable progress in U.S.-Vietnam and/or U.S.-Laos relations, the USG consider the MC/S as a preferred channel for any U.S. assistance to Southeast Asian countries;

B. Assuming a stalemate in U.S.-Vietnam and/or U.S.-Laos relations, the USG consider token support to the MC/S and/or bilateral project assistance through the Thai National Mekong Committee for a few, select MC/S sponsored projects in Thailand, e.g., pilot fish farms, irrigated agriculture pioneer projects, and watershed protection.

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APPENDICES

Appendix No.

1. List of References.

2 Contributions by USA to Mekong Committee Financial Resources, 1957-75.

3 Contributions to Mekong Committee Financial Resources, 1957-76, by all Donors Excepting the USA.

4 Selected Contributions of Basic Hydrologic Data Section of Mekong Secretariat(1966-77).

5 Data on Training of Mekong Secretariat Riparian Staff (Activities in which USA Participated).

6 Data on Training of Riparian Country Personnel (Activities in which USA Participated).

7 Data on USA Technical Advisory Services Furnished to Mekong Committee.

8-A Summary of Information on Mekong Committee's program of experimental farms.

8-B Summary of Information on Mekong Committee's Programme of Pioneer Agricultural Projects.

8-C Summary of Agricultural Master Planning Sponsored by Mekong Committee.

9 Proposed Expanded USA Commitments to the Mekong Committee Programme for 1973-75.

10 Project Appraisal Report Team.

11 List of Meetings of the Mekong Committee since 1957.

12-A Applications of Modeling for Lower Mekong Basin Planning.

12-B Computer Usage by the Mekong Secretariat.

13 Summary of Basic Fisheries Data and Related Studies in Lower Basin Sponsored by Mekong Committee.

14 Summary of Socio-Economic Bench Mark Surveys.

15 Summary of Agro-Industrial Studies Sponsored by Mekong Committee.

16 Summary of Mineral Development Surveys Sponsored by Mekong Committee.

17 Summary of Studies on Resettlement Programs in Relation to Pa Mong.

APPENDIX 1

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(d) "Annex IV: Power-Oriented Industries in the Countries of the Lower Mekong Basin, A Macro-Economic Approach".

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APPENDIX 2

YEAR	PROJECT TITLE	PLANNING STUDIES	CONSTRUCTION	COMMENT
	(1957-1965 $17,359,655)			
1957	Mekong River Reconnaissance Mission	$ 44,445		
1958	Hydrologic Network	2,198,610		
1960	Navigation Improvements for Tugs and Barges		1,000,000	(USAID/Saigon)
1963	Pa Mong	14,116,600		
	(1966-1972 $18,615,037)			
1966	Ports and Cargo Handling Study	219,100		
	Design of Barges in Vietnam	80,000		
1967	Nam Ngum Development Fund		13,528,254	
1968	Nam Mune/Nam Chi Feasibility Study	502,400		USAID/Bangkok
	My Thuan Bridge Study	100,000		
1969	Atlas of Mekong Resources	459,500		
	Interpretation Equipment	14,000		
1970	Flood Forecasting Seminar	3,000		
	Flood Forecasting Experts	55,290		
	Indicative Basin Plan-Expert Services	446,328		
	Indicative Basin Plan-Publication	15,000		
	Pa Mong Islands-survey	34,000		
	Keng Kabao Rock Blasting Study	15,000		
	Aquafer and Potash Studies	30,817		
	Water Borne Diseases Study	640,276		
1971	Evaluation Filtration Water Unit	27,930		
	Rehabilitation Vientiane Plain Farm	20,000		
	Vientiane Diking		250,000	USAID/Lao
	Flood Control-Studies of Effects	24,750		
	Vientiane/Nong Khai Flood Control Study	56,100		
	Water Resources Advisor	46,000		
1972	Saltwater Intrustion Investigation	75,000		
	Groundwater Quality Study	17,500		
	Delta Silt Fertility Study	43,600		
	Stung Treng Reservoir Mapping	600,000		
	Ports and Cargo Handling Facilities		350,870	
	Keng Kabao Rockblasting		68,500	
	Mainstream Fisheries Study-Phase I	21,621		
	Nam Ngum Fisheries		39,677	
	Mekong Cadre Program	27,000		
	Publication Costs - Mekong Booklet	7,000		
	Hydrographic Equipment for Tributary	32,852		
	Hydrographic Expert Services	32,401		
	Nam Pong Fisheries Study	10,000		
	Aquatic Plant Growth Study	44,000		
	Systems Analysis Expert Services	534,350		
	Systems Analysis Training	142,921		

YEAR	PROJECT TITLE	PLANNING STUDIES	CONSTRUCTION	COMMENT
	(1973-1975 $3,638,031)			
1973	Mekong Pioneer Study	$ 40,000		
	Mekong Pioneer Project Design	500,000		
	Bench Mark Social/Econ Survey	9,430		
	Senior Engineering Advisor	76,000		2ys Funding
	Colombia River Training	30,000		
	Fellowships	25,000		
	Training in Satellite	40,500		
	Travel, Study Grants	10,900		
	Multispectral Viewer	11,900		
	Resettlement Data	52,905		
	Engineering Division-Expert Services	169,060		
	Planning Unit - Expert Services	94,520		
	Legal Consultant	47,000		
1974	Delta Soils - Heavy Clay Study	250,000		
	Vung Tan Hatchery		$ 15,000	
	Potash Drilling	105,000		
	Schistosomiasis Control		250,000	
	Legal Consultant 74/75	32,000		
	Mekong Cadre	25,000		
	Training	25,000		
	Satellite Study Tour	12,000		
	Study Tour	10,000		
1975	Delta Water Controls	11,316		
	Computer Time - Remote Sensing	27,500		
	Pa Mong Geology and Environ Study	50,000		
	Pa Mong Report Printing	7,500		
	Stung Treng Mapping-Add-on	150,000		
	Aids to Navigation	47,000		
	Keng Kabao Rockblasting		12,000	
	Water Hyacinth Evapotranspiration Study	3,700		
	Agricultural Simulation Model	23,000		
	Kenaf Study	45,000		
	Corps of Engineer-Expert Services	30,000		
	Training Grain Storage/Farm Mkt	4,500		
	Hydrologic Training Program	4,500		
	Social Aspects of Irrigation	77,500		
	Loei Protection	202,500		
	Pa Mong Downstream Effects	413,800		
	Pa Mong Resettlement Supplement	150,000		
	Basinwide Fisheries Studies	547,000		
	TOTALS	$22,253,068	$15,514,301	

Note : Total for both planning studies and construction is $37,767,369.

APPENDIX 3

CONTRIBUTIONS TO MEKONG COMMITTEE FINANCIAL RESOURCES, 1957-76

BY ALL DONORS EXCEPTING THE U.S.A.

	Planning	Construction	Total (US $)
Australia	728,000	5,567,996	6,295,996
Austria	111,000		111,000
Belgium	711,500		711,500
Canada	1,865,000	7,540,000	9,405,000
Denmark	10,000	1,217,725	1,227,725
Egypt	5,000		5,000
Finland	10,000		10,000
France	2,541,350	10,564,811	13,106,161
Germany (Fed. Rep. of)	554,412	30,621,000	31,175,112
Hong Kong	20,000		20,000
India	610,538	368,000	978,538
Indonesia	40,000		40,000
Iran	352,184		352,184
Israel	317,180	876,800	1,193,980
Italy	62,200	1,000,000	1,062,200
Japan	2,112,830	32,842,189	34,955,019
Netherlands	6,193,077	9,822,463	16,015,540
New Zealand	422,478	1,406,428	1,828,906
Norway	10,000		10,000
Pakistan		250,000	250,000
Philippines	430,957		430,957
Sweden	20,000		20,000
Switzerland	570,075	513,000	1,083,075
United Kingdom	1,244,352	2,260,000	3,504,352
Total (without U.S.)	18,942,133	125,364,713	169,517,768
Democratic Kampuchea	5,238,086	9,284,960	14,405,947
Lao PDR	4,748,463	1,254,110	6,002,573
Thailand	14,206,347	97,952,869	112,159,216
Viet-Nam	4,772,098	11,380,424	16,269,621
	28,964,994	119,872,363	148,837,357

	Planning	Construction	Total (US $)
ESCAP	799,804		799,804
UNDP	21,675,746	1,246,869	22,922,615
UNEP	205,000		205,000
UNOTC	452,799		452,799
UNESCO	17,800		17,800
UNIDO	86,820		86,820
UNICEF	50,000		50,000
FAO	140,050		140,050
IAEA	55,650		55,650
ILO	13,104		13,104
WEP	173,083		173,083
WHO	8,277		8,277
WMO	45,300		45,300
	23,723,433	1,246,869	24,970,302
ADB		3,450,000	3,450,000
IBRD		7,850,000	7,850,000
		11,300,000	11,300,000
Asia Foundation	35,574		35,574
Ford Foundation	725,639		725,639
Magsaysay Foundation	10,000		10,000
Others	288,242	67,860	356,102
	1,059,455	67,860	1,127,315
Total Non-U.S.	72,690,015	237,337,504	310,027,519
U.S. Contributinn	24,098,422	20,514,301	44,612,723
Total Resources	96,788,437	257,851,805	354,640,242

APPENDIX 4

SELECTED CONTRIBUTIONS OF BASIC HYDROLOGIC SECTION OF MEKONG SECRETARIAT (1966-1977)

(Source: Engineering Division, Mekong Secretariat, February 1977)
(In addition to Hydrologic Yearbooks)

(A) Proceedings and Papers (Prepared by Basic Hydrologic Data Section)

(1) Seminar on Hydrology, Vientiane, 20-25 November 1967.

(2) Training Course on Moving Boat Method of Measuring Streamflow, Vientiane, 1-8 June 1969.

(3) Training Course on Hydrologic Data Processing, Bangkok 7-14 June 1970.

(4) Training Course for the Collection and Analysis of Sediment, Salinity and Water Samples, Saigon, 20-29 July 1971.

(5) Training Course on Basinwide Flood Forecasting for the Lower Mekong Basin, Bangkok, 29 October - 7 November 1972.

(6) Seminar on Hydrologic Aspects of Reservoir Regulation, Bangkok, 17-25 March 1975.

(B) Flood Forecasting (Prepared by Basic Hydrologic Data Section)

(1) Proposed Implementation of a Basinwide Flood Forecasting System for the Lower Mekong Basin, December, 1969.

(2) Evaluation Report for 1970 Flood Season, December 1970.

(3) Evaluation Report for 1971 Flood Season, December 1971.

(4) Mekong Basinwide Flood Forecasting, 17 December 1971.

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(6) Basinwide Flood Forecasting System for the Lower Mekong Basin, 1972.

(7) Evaluation of 1972 Flood Forecasting Operation, January 1973.

(8) River and Flood Forecasting: Optimization of the SSARR Coefficients, June 1974.

(9) 1973 Flood Forecasting - Evaluation, Mekong Committee Publications MKG/R. 56, 18 December 1973.

(10) Evaluation of the 1974 Flood Forecasting Operation, Mekong Committee Publication MKG/R. 112, 27 November 1974.

(11) Evaluation of the 1975 Flood Forecasting Operation, Mekong Committee Publication MKG/R. 149, 2 January 1976.

(12) Evaluation of the 1976 Flood Forecasting Operation, Mekong Committee Publication MKG/R. 153, 21 January 1977.

(C) Flood Studies (Prepared by Basic Hydrologic Data Section)

(1) Geographic Study of Floods Immediately Downstream from Pa Mong in the Mekong River, December 1966.

(2) Field Survey Report of Vientiane/Sri Chiang Mai Flood Plain and Overbank Spilling Conditions During Peak Flood, 1971.

(3) Further Data on the 1971 Flood around Vientiane and Nong Khai, December 1971.

(4) Study of the Effects of Flood Control Dikes on the Hydraulics of the Mekong Adjacent to and Downstream of Vientiane, May 1970.

(5) Assessment of 1966 Peak Discharge of the Mekong at Vientiane, 1972.

(6) Flood Frequency Study of the Mekong, Mekong Committee Publication MKG/R. 7, 28 June 1973.

(7) Houay Salung and Houay Kang Pa Flood Control and Drainage Project, Mekong Committee Publication MKG/R. 76, 20 March 1974.

(D) Netherlands Delta Team Report (Prepared with assistance of Basic Hydrologic Data Section

(1) A Quantitative Analysis of the Impact of Precipitation and Flood Pattern on Paddy Production in the Mekong Delta, Working Paper I, December 1971.

(2) Evaporation and Rainfall Analysis for Agriculture Purposes, Working Paper II, October 1972.

(3) Technical Note No. 2, River Discharge, Mekong Delta in the Dry Season, October 1972.

(4) Technical Note No. 1, Water Level in the Mekong Delta River Branches, November 1972.

(5) Technical Note No. 3, Frequencies of Flooding in the Mekong Delta, December 1972.

(6) Technical Note No. 9, Water Quality in the Mekong Delta, May 1973.

(7) Technical Note No. 20, Ground Water Resources in the Mekong Delta, September 1973.

(E) Hydrologic Data Report (Prepared with assistance of Basic Hydrologic Section)

(1) Summary of Monthly and Yearly Hydrometeorological Data in the Thai Part of the Lower Mekong Basin, Mekong Committee Publication MKG/R.29, October 1975.

(2) Surface Water Hydrometric Program in Viet-Nam, Working Paper No. 4, Development and Resources Corp., January 1970.

(3) Summary of General Hydrology of the Mekong Delta, U.S. Naval Oceanographic Office, June 1967.

(4) A 5-year(1973-77) Rehabilitation of Enlargement of the Hydrologic Data Collection System for the Republic of Vietnam, DMJM & Geo Control, Saigon, December 1973.

(5) Hydrologic Data Collection Program in the Mekong Delta (Phase III), VECCO, Saigon, December 1973.

(F) General Reports (Prepared by or with assistance of Basic Hydrologic Data Section)

(1) Water Loss Due to Water Hyacinth, 1976.

(2) Probable Maximum Precipitation in the Mekong Basin, May 1970, U.S. Corps of Engineers.

(3) Potential Growth of aquatic plants in the lower Mekong basin, February 1970, U.S. Corps of Engineers.

APPENDIX 5

DATA ON TRAINING OF MEKONG SECRETARIAT RIPARIAN STAFF

(Activities in which U.S. Participated)

DATE	DESCRIPTION	LOCATION	No. of TRAINEES
1965 thru 1973:			
Apr.-Jul. 1970	Training in SSARR Model for Flood Forecasting	Bangkok	3
May.-Jun. 1972	Study Tour of Columbia River Basin.	U.S.	2
Sep.-Nov. 1973	Observation Tour	U.S.	1
	TOTAL		6
1973 thru 1975:			
Nov.72-Mar.74	Mekong Cadre Scholarships	U.S./Europe	18
Jan.74-Dec.74	Mekong Cadre Scholarships	U.S./Europe	14
Jan.75-Dec.75	Mekong Cadre Scholarships	U.S./Europe	11
	TOTAL		43*

* U.S. contribution to scholarship program amounted to 12 per cent of total, equivalent to support of 5 scholars.

APPENDIX 6

DATA ON TRAINING OF RIPARIAN COUNTRY PERSONNEL

(Activities in which U.S. Participated)

DATE	DESCRIPTION	LOCATION	No. of TRAINEES
1957 thru 1965:			
1960-62	Hydrology	Within Basin	98
1964	Land Classification	U.S.	6
1965	Systems Analysis	U.S.	4
	TOTAL		108
1965 thru 1973:			
1966-67	Systems Analysis	U.S.	6
1970	Hydrology	Bangkok	33
1972	Engineering Study Tour	Columbia River Basin	8
1973	Water Resource Projects Design	Madrid	1
	TOTAL		48
1973 thru 1975:			
1974	ERTS Imagery Interpretation	U.S.	4
	Hydrology/Engineering	U.S.	4
	Use of Satellite Imagery	Bangkok	8
1975	Hydrologic Aspects of Reservoir Regulation	Bangkok	16
1975	Grain Storage and Marketing	U.S.	1
	TOTAL		33

APPENDIX 7

DATA ON USA TECHNICAL ADVISORY SERVICES FURNISHED TO MEKONG COMMITTEE

		Estimated Man-Months
(A)	By Categories of Service	
(1)	Indicative Basin Plan (c. 1968-71)	112
(2)	Flood Forecasting (c. 1970-72)	14
(3)	Secretariat Engineering Division (to 1972)	42
(4)	Systems Analysis: To 1972	135
(5)	Water Resources Advisory, 1971	12
(6)	Chief of Secretariat Planning Unit:	
	(a) To 1972	18
	(b) From 1973-75 (mainly for Pa Mong optimization)	36
	(c) For 1974 (mainly for Pa Mong optimization)	9
(7)	Services of Secretariat's Senior Engineering Advisor, 1973-74	19
(8)	Expert Legal Services 1972-75	12
(9)	Expert Engineering Advisory Services (Systems Analysis, Cost Estimating, Environmental Effects)	14
	Total	423
(B)	Summary by PAR/Logical Framekwork Matrix Time Frames	
	Period:	
(1)	1957-65	-
(2)	1965-73	333
(3)	1973-75	67
(4)	1975-77	23
	Total	423

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SUBJECT - RED Transmittal of PAR on U.S. Assistance Mekong Program, Including Projects 498-11-995-206 and 498-15-120-220
REFERENCE -

1. Transmitted herewith is a terminal Project Appraisal Report(PAR) covering the 20 year, 1957 to 1977, U.S. participation in the activities of the Committee for Coordination of Investigations of the Lower Mekong Basin and its Secretariat(MC/S). Due to its length and form, a brief summary follows.

2. The full submission is composed of:

a) This covering airgram;

b) Four Logical Framework Matrices, prepared following AID Project Design and Evaluation Guidelines, covering the four stages of the project's evolution;

c) The PAR (modified version of the standard PAR form);

d) A narrative discussion that explains, supports, and complements the concepts presented in the Logical Framework Matrices and the modified PAR. The narrative also presents the conclusions of the review;

e) A series of 18 appendices presenting detailed background and supporting information.

3. The report was prepared by a multidisciplinary team of four members, assembled by RED/Bangkok specifically for the purpose, over the period

PAGE 1 OF 5 PAGES

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February 1-25, 1977 with the cooperation and assistance of the MC/S.

4. Historial Background: The region involved concerns all of Northeast Thailand, 93 per cent of Laos, 80 per cent of Cambodia, and 42 per cent of southern Vietnam. The Committee consists of one plenipotentiary from each country and is supported by an Executive Agent and Secretariat in Bangkok operating under the aegis of The Economic and Social Commission for Asia and the Pacific(ESCAP).

Regional water resources investigations in the basin began in 1951. U.S. investment in the activity through 1976 amounts to some US$37.7 million (22.2 in Planning and $15.5 in Construction). Total resources provided the MC/S through 1976 by 25 donor countries, 18 U.N. and other international agencies, and the four riparian countries amount to over US$354 million. MC/S activities have ranged from simple, initial hydrologic data collection activity through highly sophisticated computerized programs to major capital construction.

5. Terminal Evaluation Framework: The terminal evaluation assesses MC/S progress resulting from U.S. assistance to major portions of the Mekong program in four identifiable time frames: 1957-65, 1965-73, 1973-78 and 1975-77. Each time frame reflects changes due to program progress and events in Indochina and is marked in turn by decided changes in U.S. assistance policies:

a. Period 1957-65: Purpose: To create a capability within the MC/S for producing basic hydrologic data. U.S. assistance included a large training component, contract studies and investigations. The US also provided technical advisory services. By 1965, these inputs had helped to create a functioning basinwide hydrologic data collecting and analysis system on both the mainstream and tributaries. The reporting system included 244 gauging and 277 meteorological stations on stream. The analytic capability was characterized by both riparian and MC/S capability to routinely collect and analyze the resulting data. Since 1962 an Annual Hydrologic Yearbook has been published as well as numerous related works. In addition, extensive investigations were begun on a large mainstream dam complex, Pa Mong, primarily through AID-funded efforts of the United States Bureau of Reclamation(USBR).

b. Period 1965-73: Purposes: i) To alleviate institutional constraints, attributable to the lack of expert Mekong Secretariat riparian staff, that inhibited water resource project planning essential for socio-economic development in the Lower Mekong Basin; and ii) to deliver municipal, agricultural, and river navigation services to the populations of the riparian countries in the areas of transportation, health, water control, fisheries, and power generation. Once the basic hydrologic and meteorologic system was in place and functioning properly, generation of a broad range of activities became a possibility. Thus, in accordance with the aforenoted dual purpose, additional U.S. support was provided for both training, advisory services and investigations in many fields and for capital project studies/construction. Examples of work completed and/or initiated included additional, more detailed Pa Mong studies. Among other noteworthy achievements were socio-economic surveys, ground

water and mineral studies, completion of an Indicative Basin Plan, studies on fisheries, schistosomiasis and other waterborne diseases, soil fertility, and flood forecasting, computerized technology for use in remote sensing in tropical areas, navigational improvements, a major tributary project (Nam Ngum I), and Pioneer Agricultural Projects. These noteworthy accomplishments, in terms of both clearly demonstrated indigenous technical competence and major construction, permitted yet another change in U.S. policy.

c. Period 1973-78: Purpose: To facilitate implementation of jointly planned and selected capital projects. The planned projects were listed in the RED FY 1976 FBS. Concurrently, the USG programmed continued support for a limited number of planning efforts. Due to the cessation of hostilities in Indochina, April 1975, and a subsequent Congressional prohibition on further U.S. assistance to the Indochina countries, U.S. participation in activities were sharply curtailed after that date. Nevertheless, prior to mid-1975, a number of new obligations were initiated with FY 1974 funds, some of which only continued USG funding for on-going projects in accordance with existing agreements. Among them were continuing studies on fisheries, resettlement, schistosomiasis control, Mekong Cadre Development, and technical, advisory, and legal services. Importantly, the USG made a $5.0 million loan (subsequently withdrawn) for Nam Ngum II, in concert with eight other donor countries and the ADB. In addition, a number of new activities were begun. These included potash exploration, kenaf for paper pulp, computerized agricultural system simulation, computer processing of satellite imagery tapes and heavy clay delta soils studies. During the period only one project was completed, that is, the Smithsonian Schistosomiasis contract in late 1974.

d. Period 1975-77: Purpose: To close out U.S.G. support to Mekong, activities in accordance with Section 109, 1961 F.A.A. as amended in June 1975, within established legal commitments and management practices and to maximize returns from previous U.S. investments. Despite the Indochina wars, which seriously disrupted MC/S activities and U.S. support therefore, diligent and resourceful MC/S reprogramming facilitated almost full completion of the large number of active projects and activities that were in-process during the period. Only two activities, Heavy Clay Delta Soils, that was 10% complete, and one sub-activity designed to measure the prevalance of schistosomiasis on Khong Island, Laos, failed to produce adequate returns on U.S. funds. Completed either as originally designed, or very close thereto, were several large and multi-faceted projects: Pa Mong Optimization and Downstream Effects Study, Mekong Ports and Cargo Ramps and Keng Kabao Channel Clearing. Among the other activities completed were the following: Agro-industrial Studies, University of Lowell Schistosomiasis Control, Mekong Agricultural System Simulation, Stung Treng Mapping, Delta Water Control Rehabilitation Reconnaissance Study, legal assistance (Declaration of Principles for the Use of Waters of the Lower Mekong Basin and draft Pa Mong Authority), Computer Processing of Satellite Imagery Tapes, Procurement of Hydrologic Spare Parts, Nam Ngum Post-Impoundment Study, Basinwide Fisheries, Pa Mong Resettlement Study, Potash Exploration, Pioneer

Agricultural Projects, Navigational aids, Evapotranspiration Losses due to Water Hyacinth, Mekong Cadre Development and supporting technical and advisory services. As of this date only minor actions remain outstanding, e.g., distribution of reports and MC/S receipt minor USG-shipped hydrographic Spare Parts. Only two activities remain to be financially concluded viz., the payment for the Pa Mong Resettlement Report's Final Printing, and the resolution of a small claim on the schistosomiasis project in Laos.

6. Review of Current Status of MC/S: Undoubtedly, the proven administrative capability, financial responsibility and technical competence of the MC/S, easily traced to the long-term conscientious and systematic approach to the establishment of the MC/S and the program, and its basic apolitical approach, have permitted the MC/S to survive and function after the events of 1975 when all other like activities in Southeast Asia were virtually terminated. Indeed, we have witnessed an extraordinary institutional resilience on the part of the MC/S. Further, there is considerable evidence that Thailand, Laos, and perhaps Vietnam (as host countries) and at least a respectable number of donors still view the MC/S as a desirable and viable institution. The MC/S continues to serve as an excellent channel for future development assistance to Southeast Asian countries (Ref. Bangkok 25968, 5113, 10444, 11632, 34833, 2065, 2174 and 5214).

At the same time, and as of this writing, however, most present and potential donors are maintaining a cautious wait-and-see attitude. Bothersome are the following issues: a) no indication from Cambodia of interest in the activity, thus currently preventing a meeting of the full four-member Committee and the initiation of many new activities; b) spurious restrictions on travel of foreign technicians and experts in Laos and Vietnam; c) localized and intermittent problems on Thai borders; and d) the continuing flow of refugees into Thailand from Laos, Vietnam and Cambodia. Taken together, these issues tend to cloud the Southeast Asian scene. In spite of continuing efforts by the MC/S to remain, to the extent possible, apolitical, it and the program are not entirely immune to the effects of these disquieting factors.

Thus, in summary, it may be said that the MC/S still remains a viable, functioning institution, albeit currently operating at approximately half its desired strength, and probably capable of recouping previous host country and donor support should future relations between at least three of its members (Thailand, Laos and Vietnam) flourish. This also assumes gradual betterment of travel and working arrangements for expatriot advisors. The MC/S is still capable of adequate project design and implementation, but incapable, at the moment, of implementing any very large regional program without additional staff. This is not to say that related bilateral type activities or inter-regional projects the size of Nam Ngum are beyond present MC/S ability to design and sponsor. It is rather to say that a much better indigenous political climate, more forthcoming donor support (including UNDP) and significant increases in Secretariat staff are prerequisities to an MC/S program approximating

the 1973-74 or previously proposed 1975-76 levels.

The MC/S has assured funds for its operational budget for calendar year 1977: UNDP is contributing three-quarters of the total and other donors are contributing the remainder (See Bangkok's 2177, 3315 and 33802). This budget enables the Secretariat to continue a respectable program and to assist Laos and Thailand on a bilateral basis on projects long since approved in the Committee's work plans (see Bangkok's 2065, 3223 and 34833). Expectations are fairly high that a Committee meeting may be in the offing for this year, even without Cambodian participation. In such event, any expansion of Secretariat activities, e.g., in Vietnam, would require a gradual build-up of Secretariat staff. Resources for such a build-up would have to come from other donors, given the tightness of the UNDP budget.

In the wake of a relaxation of current legislative constraints on US assistance to Indochina, a renewal of U.S. support for the Secretariat could have certain advantages. The Secretariat's proven record as a development administration and implementation agent would undoubtedly assure wise use of any such assistance, while eliminating the necessity for any direct US entanglements on a bilateral basis. Even a token manifestation of U.S. assistance could be a source of reassurance to Southeast Asian countries looking for evidence of continuing U.S. interest in this region. By working through the Secretariat, the U.S. could be assured of a balance in the allocation of funds for projects among the riparian countries, thereby alleviating any concern by individual member countries that other members were receiving a disproportionate share of development resources available to the organization as a whole.

In a different vein, the history and experience of the Mekong Committee holds considerable value as a model on which to pattern multilateral river basin development programs, e.g., in Africa, particularly as such programs address the problems of the Sahel. While the attached PAR and its appendices do not pretend to be comprehensive on this subject, they do serve as a starting point; between the archives of the Secretariat and considerable reference material still held by R.E.D. more detailed information can be developed in response to appropriate inquiries.

WHITEHOUSE

PROJECT APPRAISAL REPORT

COVERING TWENTY YEARS (1957-77) OF U.S. ASSISTANCE TO THE PROJECT ENTITLED COMMITTEE FOR COORDINATION OF INVESTIGATIONS OF THE LOWER MEKONG BASIN

(Including Projects Numbered 498-11-995-206 and 498-15-120-220 and with reference to RED PARS 75-1, 3, 5, 7, and 8)

(Relevant Documents prepared by Regional Economic Development Office team include: Transmittal Airgram, Four Logical Framework Matricies, Project Appraisal Report, Supporting Narrative Discussion, Supporting Appendices)

The attached documents constitute the documentary material described in paragraph 2 b, c, d, and e of TOAID A-36, subject: RED Transmittal of PAR on U.S. Assistance, Mekong Program, dated April 18, 1977.

February 25, 1977

Summary	Objectively Verifiable Indicators	Important Assumptions
[illegible] raise the level of socio-economic [illegible]tion among the countries and people [illegible] lower Mekong basin.	A.2 Measurement of Goal Achievement Mekong Committee established by riparian country government statute in 1957 with the country members having plenipotentiary authority. Statute remains in effect. Mekong Committee, over period 1957-76, has held 49 meetings(Appendix 11). The Mekong Committee meetings have been complemented by an Advisory Committee, which has met 24 times. Ad hoc sub-committees have met on navigation improvement(1961-64), and on agriculture(since 1971). Also, National Committees were formed in each country (starting in 1957) for liaison with the member governments. A Declaration of Principles was adopted by the Committee members in 1975, based on their plenipotentiary authorities, including a series of basic principles governing utilization of the lower basin waters (which remains in effect)(Ref. 13). Continuing financial contributions by the riparian countries totaling $1.3 billion through 31 December 1976 were made in a [illegible] (See Appendix 3). Continuing financial contributions by some 31 donors other than the USA, totaling $10 billion through 31 December 1976, including [illegible] specialized agencies, [illegible] governments, the IBRD and IDA, and numerous private foundations and others(Appendix 3).	A.3 (as related to goal) That cooperation among the riparian countries continues. That support from other donors international, national, and private is ongoing. (Note: The U.S. support for period 1957-1977 amounts to 13% of the total Mekong Committee operating resources for the 20-year period. Figure 1 and Appendices 2 and 3 illustrate the relationship between U.S. funds and funds from other sources).
[illegible]rpose [illegible] create a capability within the [illegible] Secretariat for producing basic [illegible]logic data 1957-1965.	B.2 End of Project Status Basic hydrologic data being produced as needed for resource project planning including establishment and operation of a basinwide system of stream gauging and meteorological stations, routine collection of data, and analysis of such data to produce firm and statistically reliable estimates of mainstream and tributary flows throughout the lower basin. Specific indicators are: (1) Publication of Annual Hydrologic Yearbooks(since 1962) presenting annual compilations of comprehensive hydrologic/meteorologic data throughout the basin, including amounts of runoff in the mainstream and tributaries, suspended sediment data, water quality information, climatological data (precipitation, evaporation, and wind data), and seismological data(Ref. 14). (2) Analysis of the basic data, including synthesis of streamflow quantities from rainfall-runoff relationships and simulations, resulting in firm basic data directly useful for hydrologic engineering analyses both for water resource project design and flood forecasting, involving a great number of supplementary publications(Appendix 4). (3) Establishment of a Hydrologic Coordinating Committee made up of the Chief Hydrologists of the member countries in 1968, which has met regularly (through 1974) to guide the Mekong Secretariat's overall hydrologic/meteorologic data program and to facilitate cooperative inputs by the member countries in establishing and operating the hydrological/meteorological stations(Ref. 137).	B.3 (as related to purpose) That riparian countries will establish and operate gauging/monitoring stations and furnish data routinely to Mekong Secretariat.
[illegible]tputs [illegible]asinwide hydrologic system [illegible]blished and functioning.	C.2 Output Indicators System functioning for collection, compilation, and publication of basic data both with annual and supplementary reports. Specific indicators are: (1) A total of 224 hydrologic stations and 277 meteorological stations established and operating(1976), obtaining comprehensive information on streamflow quantities and related climatologic data and supplemental data on water quality, and salinity intrusion(Ref. 14). (2) Publication of the Annual Hydrologic Yearbooks and numerous supplementing publications(Appendix 4).	C.3 (as related to outputs) That competent candidates will be available from riparian countries and Mekong Secretariat for staffing the system, that adequate funding will be available as needed to supplement the U.S. input.
[illegible].1 Inputs (1) Contract studies and investigations [illegible]) Training of riparian country and of Mekong Secretariat riparian staff. Technical advisor services [illegible] Equipment	D.2 Budget/Schedule (1)(a) Mekong river reconnaissance(USBR)(1956-57) ($45,000)(Ref. 2). (b) Basic hydrologic survey and establishment of network (Harza)(completed 1962)(Ref. 12) ($2,198,610). (c) Pa Mong Investigation initiated (USBR)(Total Cost $15,241,900)(Ref. 3). (2) Training of 108 riparian country staff primarily in hydrology(Appendix 6). (3) While it is not possible, from either RED or MC/S records, to quantify the man months of professional services provided during this period(1957 thru 1965) it is obvious that a program of this magnitude could not have been launched without some input of this type. Records do show that the Corps of Engineers was involved in at least a consultative capacity in systems analysis. It can be assumed therefore, that at least part of the 333 man months of services shown for the 1965 thru 1973 period (Appendix 7) were actually performed during this period. The total man months shown(423) is believed to be reasonably accurate. (4) Furnishing of spare parts and replacements for basinwide gauging/monitoring stations ($473,189) (1957-65)(Ref. 141).	D.3 (as related to inputs) That Mekong Secretariat has institutional capability and funds (as needed to supplement the US contribution) to carry out planned activities; also: (1) That pertinent results of studies will be seriously considered and utilized in the continuing planning of water resource development in the lower basin. (2) That the training programs will make suitable allowances for attrition. (3) That the advice of the professional advisors will be given serious consideration and utilized as applicable. (4) That delivery of equipment will be made in a timely manner.

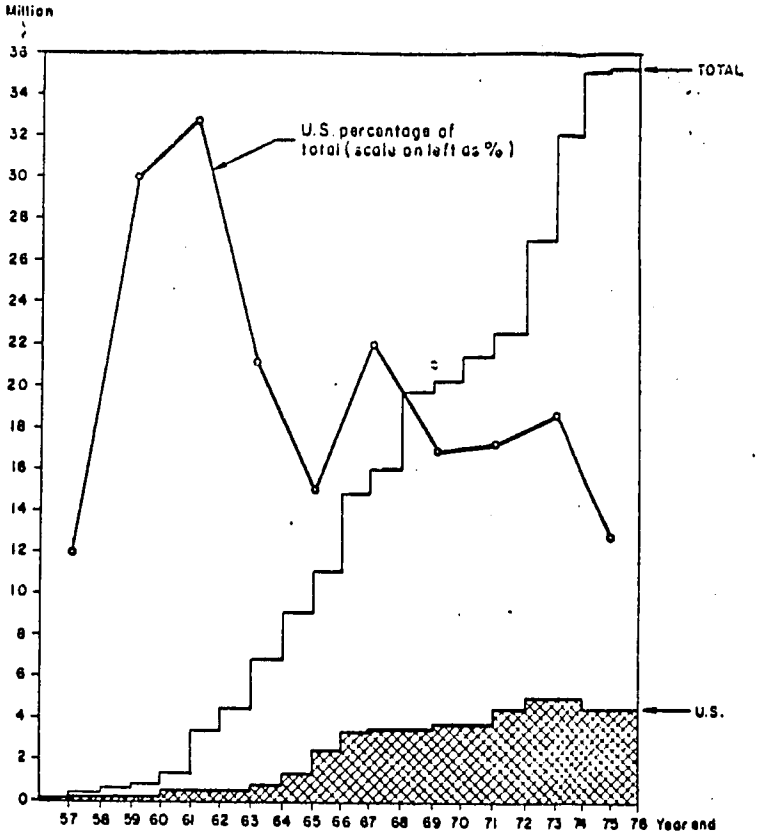
Summary	Objectively Verifiable Indicators	Important Assumptions
A.1 Goal	A.2 Measurement of Goal Achievement	A.3 (as related to goal)
B.1 Purpose (1 of 2 for 1965-73) (b)(1) To alleviate institutional constraints, namely the need for expert Mekong Secretariat riparian staff, inhibiting water resource project planning essential for [illegible] water of Mekong Basin (1965-73).	B.2 End of Project Status Institutional capability progressively built up for carrying out activities, including contracting capability, for planning of dams/reservoirs, irrigation systems, power generation and distribution, agricultural cropping systems, navigation improvements, and socio-economic improvements [illegible] accomplished primarily through training of Mekong Secretariat staff in disciplines of systems analysis, hydrology, agriculture and soil science, navigation, socio-economic parameters, water-related public health hazards, and biological and ecological aspects of water resource project development. The results are evidenced by publication of some 300 studies and projects (Ref. 6) dealing with all aspects of water resource development.	B.3 (as related to purpose) (a) That the Mekong Secretariat has institutional capability to conduct a wide range of studies, in cooperation with the riparian countries, and that the Mekong Committee will receive necessary financial support in addition to US contribution.
C.1 Outputs (1-a) Approximately 500 studies completed for continuing water resource project planning throughout lower basin, including both basinwide studies and evaluations of special [illegible] problems. (1-b) Basinwide flood forecasting system established and operating.	C.2 Output Indicators (1-a)(1) Pa Mong Stage One report, (completed 1970) (Ref. 4). Pa Mong Phase II report ($14,054,600) (USBR)(completed 1972)(Ref. 5). (1-a)(2) Pa Mong Optimization and Downstream Effects study including Stung Treng mapping, basinwide fisheries study, Pa Mong resettlement planning study, downstream degradation studies, irrigation return flow salinity study, delta soils management study ($2,692,000)(1973-76)(Ref. 7). (1-a)(3) Socio-economic benchmark surveys and preliminary resettlement studies in support of Pa Mong Stage One and Phase II reports ($130,405)(1965-75) (Appendix 14). (1-a)(4) Indicative Basin plan ($507,328 of total of $526,649). (1-a)(5) Tributary reservoir fishery studies (in support of Pa Mong Project)(1965 to 1975)($49,677) (Appendix 13). (1-a)(6) Public health studies (schistosomiasis and other water borne diseases)(in support of Pa Mong project)($890,276)(Smithsonian)(1971 to 1974) (Ref. 129)(and Lowell University, 1975-76). (1-a)(7) Development of computerized technology for use of satellite imagery in tropical regions ($27,500) (1976)(AIT)(Ref. 130). (1-a)(8) Delta soil fertility study ($43,600)(1974) (University of Hawaii)(Ref. 65). (1-b) Timely alerting of lower basin countries of predicted flood hazards (daily alert transmitted by radio (Ref. 23).	C.3 (as related to outputs) (1-a,b) That the Mekong Secretariat continues to receive UNDP institutional support. That competent consultants will be available. That funding from other donors will be available as needed to supplement US input.
D.1 Inputs (1-a) Training of Mekong Secretariat and riparian country staffs. (1-b) Technical advisory services. (1-c) Financial support for studies, including USBR participation. (1-d) Computer services (Appendix 12). (1-e) Data compilation. (1-f) Equipment	D.2 Budget/Schedule (1-a) Total of 6 Mekong Secretariat and 48 riparian country staff trained in disciplines noted above (Appendices 5 and 6). (1-b) Estimated 333 man-months of professional US agency staff (not including USBR direct operations on Pa Mong Stage I/Phase II reports)(Appendix 7). (1-c) Total budget contribution of $2.7 million. (1-d) Rental of total of 5,185 hours of computer time (Mostly U.S. supported)(Appendices 12-a and 12-b). (1-e) Publication of Atlas of Mekong Resources (Ref. 131). (1-f) Furnishing of spare parts and replacements for basinwide gaging/monitoring stations ($220,000) (1968)(Ref. 141).	D.3 (as related to inputs) (1-a) That additional competent candidates will be made available from riparian countries, including allowances for attrition. (1-b) That the advise received will be seriously considered and used as appropriate.

Summary	Objectively Verifiable Indicators	Important Assumptions
A.1 Goal	A.2 Measurement of Goal Achievement	A.3 (as related to goal)
B.1 Purpose (2 of 2 for 1965-73) (a)(2) To deliver or improve municipal, agricultural, and river navigation services to the populations of the riparian countries in the areas of transportation, health, water control, fisheries and power generation (1965-73).	B.2 End of Project Status Mekong river port and cargo handling facilities improved by construction of concrete loading/unloading ramps. Increased power generation, irrigation potential, flood control, and established fisheries as result of construction of Nam Ngum I dam. Improved flood protection for Vientiane as result of construction of protective dikes. Improved navigation and river transportation resulting from removal of rock obstructions at Keng Kabao. Fish production raised from zero to 1,800 tons as a result of construction of the Nam Ngum fisheries	B.3 (as related to purpose) (a) That feasibility studies are completed; (b) that Mekong Committee continues to receive UNDP institutional support; (c) that the Mekong Secretariat has staff capability for managing and guiding project development in cooperation with riparian countries; and (d) that funds will be available from other donors as needed (in addition to U.S. input).
C.1 Outputs (a) Participated in funding of: (1) A Major tributary dam/reservoir project. (2) Initiation of preliminary design of a group of 11 pioneer agricultural projects. (3) Pledge for major Mekong river bridge. (b) Financial: (1) Initiated navigation improvements on Mekong river. (2) Preliminary design of water control diking to protect Vientiane. (3) Nam Ngum reservoir fisheries established, including hatchery. (4) Farm rehabilitation.	C.2 Output Indicators (1) Nam Ngum I power generation and sale of power to Thailand, and annual reservoir fish catch of approximately 1,800 tons (Ref. 19, 41, 42, and 43). (2) Completed feasibility reports and preliminary designs prepared by IBRD and ADB (See Appendix 8-b). (3) Feasibility report reviewed (My Thuan Study)(Ref.142). (1) Initiated work on seven ramps/cargo handling facilities constructed in Thailand and Laos($265,870), plus rock blasting at Keng Kabao for deepending river channel($105,000)(See Appendix 2) and study on Navigation aids($47,000)(Ref. 143, 144), (2) Corps of Engineers report(Ref. 145). (3) Mekong Committee publication(Ref. 43). (4) Mekong Committee publication(Ref. 146).	C.3 (as related to outputs) (1) That international financing ($13 million in addition to U.S. input) be available, and Thailand willing to buy power. (2) That international financing to be available (in amount of $71,677 in addition to U.S. input), that IBRD will coordinate program. (3) That feasibility report prepared by others will be acceptable by international standards. (1) That international financing will be available and there will be justifiable volume of river traffic. (2) That it is necessary to provide flood protection to Vientiane. (3) That it is desirable to produce fish for local consumption, and that competent reservoir fishery management will be provided.
D.1 Inputs (a)(1) Contributed $13 million. (2) Contributed $500,000. (3) Pledged $5 million. (b)(1) Contributed $238,000 for fompletion of 7 ramps, plus additional funds for uncompleted ramps. (2) Contributed $50,000 for feasibility study (Corps of Engineers)(1971) (USAID Laos contribution not included). (3) Contributed $25,000 for fingerlings and advisors (not including USAID Laos contribution). (4) Contributed $20,000 toward rehabilitation of Vientiane Plain Farm.	D.2 Budget/Schedule (a)(1) Mekong Committee publication (Ref. 147). (2) Mekong Committee publication (Appendix 8-B). (3) Other donors financing not sufficient to proceed with project. (b)(1) Mekong Committee publication (Ref. 143). (2) Mekong Committee publication (Ref. 145). (3) Mekong Committee publication (Ref. 43). (4) Page 77, 1976 Annual Report (Ref. 146).	D.3 (as related to inputs)

LOGICAL FRAMEWORK MATRIX-PROP WORKSHEET

Summary	Objectively Verifiable Indicators	Important Assumptions
A.1 Goal	A.2 Measurement of Goal Achievement	A.3 (as related to goal)
B.1 Purpose (c) To facilitate implementation of jointly planned and selected capital projects(1973-78): (1) Nam Ngum Phase II (2) Drayling (3) Upper Nam Ngum (4) Pa Mong Multi-Purpose Project (5) Pioneer Agriculture Projects (6) Battambang Multi-Purpose Project (7) Mekong Basin Development Planning (U.S.G. Policy changed in 1973 to concentrate on implementation of capital construction projects - as opposed to additional feasibility studies.)	B.2 End of Project Status Ref. Field Budget Submission, FY 1976, East Asia Regional.	B.3 (as related to purpose)
C.1 Outputs (1) Support of Nam Ngum II evaluation. (2) Participation in financing of Nam Ngum II. (3) Stepped up level of financing of Pa Mong Optimization and Downstream effects study including major resettlement and fishery investigations	C.2 Output Indicators (1) IBRD report (Ref. 189). (2) $5,000,000 loan made. (3) Pa Mong Optimization and downstream effects report (Ref. 8).	C.3 (as related to outputs) (1) That expansion of project will benefit Lao/Thai economies. (2) That results of evaluation study is positive. (3) That study needs to be completed with information on all key questions sufficient to permit decision whether to build.
D.1 Inputs (1) $40,000 contribution to Num Ngum II evaluation. (2) $5,000,000 loan. (3)(a) Increased financial support of Pa Mong Optimization and Downstream Effects Study totalling $2.2 million. (b) Advisors (c) Training of Mekong Secretariat riparian staff in systems analysis and cost estimating.	D.2 Budget/Schedule (1) IBRD report (Ref. 189). (2) Loan agreement (3)(a) Pa Mong Optimization and Downstream Effects Study report (Ref. 8). (b) Estimated 67 man months of professional services from Corps of Engineer specialists for project guidance and consulting (See Appendix 7). (c) Total of 43 Mekong Secretariat staff and 33 riparian country staff trained in disciplines noted. (Appendices 5 and 6) Total U.S. Contribution for training, for the entire period 1957 thru 1975, amounts to $172,745, of which $101,060 was for Mekong Secretariat staff and $71,685 for riparian countries.	D.3 (as related to inputs) (3)(b) That advice will be seriously considered and effectively utilized. (c) That training programs include allowances for attrition.

Summary	Objectively Verifiable Indicators	Important Assumptions
A.1 Goal	A.2 Measurement of Goal Achievement	A.3 (as related to goal)
B.1 Purpose (d) To close out U.S.C. support to Mekong activities in accordance with Section 109, 1961 F.A.A. as amended in 1975, within established legal commitments and management practices and to maximize returns from previous U.S. investments(1975-77).	B.2 End of Project Status Conclusion or close out of U.S. participation in Mekong Committee activities.	B.3 (as related to purpose) That the Mekong Secretariat will continue to function and receive international financial support, from other donors. That there will be continued access to project areas in Thailand.
C.1 Outputs (1) Completed Pa Mong Optimization and downstream effects study. (2) Partial completion of delta soils study (closed out after approximately 10% completion). (3) Concluded navigation improvement program. (4) Completed agro-industrial studies. (5) Partially completed schistosomiasis control operations program (closed out after approximately one-third completion). (6) Completed agricultural modeling project. (7) Completed Stung Treng mapping. (8) Completed delta water control rehabilitation study. (9) Completed consulting assistance on international water law. (10) Completed computer processing of satellite imagery tapes. (11) Completed procurement of hydrologic [illegible]	C.2 Output Indicators (1) Final study report (Ref. 8). (2) Mekong Committee publication (kef. 148). (3)(a) Final ramp completed in 1976 (Chieng Saen, Thailand)(Ref. 143). (b) Main obstacles removed from rivar channel (Ref. 144). (c) Mekong Committee publication (Ref. 8). (4)(a) Completion of potash explorations with evidence of large-scale commercial deposits(Ref. 102 and 120). (b) Completion of evaluation of kenaf for pulp and paper manufacture (Ref. 90). (5) University of Lowell final report (Ref. 149). (6) Modeling of irrigated agriculture in Pa Mong optimization (Ref. 64). (7) Maps and computer analyses completed and delivered. (8) Mekong Committee publication (Ref. 149). (9) Drafting of model Pa Mong Authority (Ref. 193). (10) Deliveries as reported in Mekong Committee publication (Ref. 150). (11) Deliveries as reported in Mekong Committee publication (Ref. 141)(two-thirds delivered, one-third back-ordered). [illegible] of study (Ref. 153)(Smithsonian).	C.3 (as related to outputs) That all U.S. supported activities will be completed not later than December 1976.
D.1 [illegible] (1) [illegible] completed [illegible] activities [illegible] (2) [illegible] completed training activities (3) Technical advisors.	D.2 Input/Schedule (1) [illegible] additional financing totaling $1,400,000. (2)(a) Hydrology work shop (1975)(riparian country staff)(Ref. 15[illegible]). (b) Satellite imagery training conference (1975) (both riparian country and Mekong Secretariat staff)(Ref. 156). (3) Estimated 23 man-months of professional services from Corps of Engineers for assistance on Pa Mong optimization and flood forecasting. (Appendix 7) [illegible] U.S. contribution for professional services [illegible] period, 1957 thru 1977, amounts to [illegible]	D.3 (as related to inputs)



CUMULATIVE U.S. AND TOTAL CONTRIBUTIONS TO THE OPERATIONAL RESOURCES OF THE MEKONG COMMITTEE (PLEDGES) 1957 - 1976

FIGURE I

APPENDIX 8-A

SUMMARY OF INFORMATION ON EXPERIMENTAL FARMS SPONSORED BY MEKONG COMMITTEE (1976)

Name of Farm	Co[illegible]	History	Descriptions/Notes on Station	Details of Tests and Work Progress (1973-75)	Technical Support to Pioneer Projects	Annual Budget US$ (Current)
Hat Dok Keo (Lao PDR)	Irrigated agriculture under riverine conditions.	From [illegible]-5 was UNDP/FAO project. Israel has provided technical assistance since 1965.	17 ha research plus 300 ha experimentation. 275 resident families: Twice severely damaged by Mekong floods (in 1966, 71) with high rehabilitation costs.	Dry season tests included fertilizers and varietal comparison tests on maize, groundnuts, and market garden produce. New varieties of corn and barley tested. Seed multiplication in demonstration area. Experiments with colmatage (incremental levee soils).	Casier Sud	172,000
Kalasin (Thailand)	Irrigated agriculture on lowland soils of NE Thailand.	Since 1[illegible] has been UNDP/FAO project.	1[illegible]/300 ha for research/experimentation. 75 farm families. 1974 program included training of 40 extension agents plus courses for Kasetsart students.	Dry season tests 1973-74 on irrigated crops (cotton, groundnuts, maize, rice). Varietal tests for vegetables, soybeans, groundnuts, sun flower, plus varietal tests on jute between main dry and rainy season growing periods. Year around tests on fertility maintenance, crop rotation systems, and economic evaluation. Varietal tests on dates for planting and fertilizations requirements for local varieties and hybrids.	Las Pao	140,000
Prek Thnot (Democratic Kampuchea)	Irrigated agriculture on lowland soils of central plain of Democratic Kampuchea.	Technical assistance from Israel since 1965. Station was moved in 1973 to temporary site at North Phnom Penh polder.	15/170 ha for research/experimentation. Three pumps installed for supplying water from Prek Thnot river to 10 villages.	Tests (prior to moving of station) on selection of paddy varieties and other crops such as groundnuts, soybeans, and vegetables, including fertilizer needs, cultivation practices, and control of pests and diseases. Tests on diversification of irrigated crops especially maize, groundnuts, jute, kenaf, and market garden crops. Establishment of farmers associations in demonstration zone for credit, mechanization, and marketing.	Prek Thnot	144,000
Banan (Democratic Kampuchea)	Irrigated agriculture on lowland soils of NE plain of Democratic Kampuchea.	UNDP/FAO project since 1967.	15/300 ha for research/experimentation.	Dry season tests on rice cultivation (varietal comparisons, triple cropping nursery management), crop diversification (fertilizers, sowing dates, varietal tests), and introduction of forage crops (maize, sorghum, seed multiplication). Rainy season tests with rice (fertilizer applications, nurseries), fertilizer and variety comparisons for various crops, and research on cropping techniques for forage crops.	Banan	240,000
Trek [illegible] (Democratic Kampuchea)	Irrigated crops on levee soils in Democratic Kampuchea.	Sponsored by Mekong Committee since 1972.	Farm covers 30 ha with old facilities for pumped irrigation with underground ducts in poor condition. Most of area flooded 4-5 times per year which excludes rainfed cropping; however 2 crops/year possible after flood season over provided adequate machinery available.	Cultivation of levee crops such as maize, sesame, soybean, mungbean, groundnuts, sorghum. Adaptation tests on high-yield rice varieties, plus varietal tests of levee crops. Launching in 1974 of SEARCA program on high protein crops and IRCP program on maize and sorghum. Program in 1975 includes study of fertility and irrigation problems with levee crops.	Muk Kompoul	Data unavailable
Tuol Samrong (Democratic Kampuchea)	Irrigated crops and rice mechanization on semi-inundated lowlands in Democratic Kampuchea.	Originally established in 1962 with Japanese assistance. Sponsored by Mekong Committee since 1972.	Has spacious building and well equipped laboratory. Total acreage of 300 ha of which 250 ha reserved for experimentation and seed production.	Tests on rice genetics and cultivation methods. Seed multiplications, fertilizer applications, and cropping techniques for selected rice varieties cultivated during rainy season.	Bovel	Data unavailable
Eat Hat (Viet-Nam)	Irrigated agriculture in central highlands of Viet-Nam.	Field preparations and training in 1972 to prepare for start of operations in 1973.	Irrigated research area of 16.4 ha. Construction of irrigation system completed in 1972. Plans for additional improvements include construction of dam on nearby stream plus establishment of experimental area to be irrigated from dam.	Irrigation experiments (water requirements and irrigation techniques) and comparative tests (crop suitability for different cropping seasons) on upland rice, groundnuts, soybeans, corn, wheat, sweet potatoes, and rape seed, with economic evaluation of each crop to achieve profitable cropping pattern (3 crops per year for upper Sre Pok area). Economic tests of crop rotating systems.		About 100,000
An Giang (Viet-Nam)	Floating rice and irrigation of seasonally flooded soils.	Came under sponsorship of Mekong Committee in 1973.	Farm includes 6.4 ha for crops plus 15 adjacent ha for extension work. Area is regularly flooded from 2-2.5 m. Consulting assistance from International Rice Research Institute.	Testing of varieties of floating rice during wet season and of irrigated crops in dry season including soybean, groundnuts. Use of fertilizers for soybeans and sorghum. 1975 program included soybeans and other oil producing crops and seed multiplication for rice varieties.	Caisan	Data unavailable

Sources from Reference 7.

APPENDIX 8-B

APPENDIX 8-B'

SUMMARY OF INFORMATION ON MEKONG COMMITTEE'S PROGRAMME OF POWER AGRICULTURAL PROJECTS (1976)

(U.S. participation limited to projects 1 through 12)

PROJECT NO.	PROJECT NAME	AREA (ha) (Total / Farm)	POTENTIAL APPLICATION AREA (ha)	POPULATION Families	BUDGET (U.S. millions) (Total / foreign)	PREVIOUS ACTIVITIES (Completed)	CONTRACTING STAGE	PERIOD OF PROJECT (years)	OBJECTIVE AND DESCRIPTION
	Democratic Kampuchea								
(1)	Huk Kampul	4,500 / 2,200	100,000	14,000 / 2,200	2.6 / 1.3	Jan. 1975	Pending	16	Pump irrigation for levee areas 3 km wide extending 17 km along west bank of Mekong river north of Phnom Penh, with improved agricultural supporting services including credit. Average 1.5 ha in family farm.
(2)	Bovel	46,000 / 4,000		60,500 / 8,500	9.8 / 4.2	Jan. 1975	Pending	7	Rehabilitation project to restore gravity irrigation scheme using unregulated flow of Great Lake tributary for wet season rice irrigation for 29,000 ha plus more intense cultivation of 4,000 ha.
(3)	Trek Thnot	5,000 / 3,000	70,000		10.45 / 7.0	July 1975	Pending	3 to 5	First stage of storage irrigation project for transition from rainfed subsistence to intensive diversified land use with year around irrigation including use of higher yielding rice varieties, with support from farmers organization.
	Lao PDR								
(4)	Casier Sud	5,100 / 3,200			9.04 / 5.32	1974	Pending	7	Pump irrigation for river bank areas and improvement of rainfed crops for river levee and flood plain soils, including construction of flood control dike, river pumping plant, and integrated irrigation and drainage system.
(5)	Savannakhet Plain				?	July 1975	Pending	-	Improvement of agriculture with flood protection and pump irrigation (rural development)
	Northeast Thailand								
(6)	Pump Irrigation	2,000 / 1,600			3.1 / 1.7	Jan. 1975	To start 1- 1975	7	Pump irrigation for river bank areas, rehabilitation of five pump station systems built in 1960's, plus completion of irrigation distribution, with objective of determining degree of water control and drainage needed. To be funded by RTG.
(7)	Tank Irrigation	5,000 / 3,400			4.0 / 1.9	Jan. 1975	Pending	10	Development of best methodology for gravity irrigation from numbers of small reservoirs or "tanks", including completion of irrigation distribution and of service roads.
(8)	Rainfed Rice		1,000,000			1974	$1.4 million allocated in 1974	-	Systematic study of rainfed rice cultivation, breeding of imported varieties, and improved seed multiplification, with improved extension services and training.
(9)	Rainfed Upland Crops					July 1975	Pending	-	Testing of viable farm systems for sustained cropping of upland soils including use of 10 agricultural stations in northeast, and final land clearing, with improved extension services.
	Viet-Nam								
(10)	Go Cong	7,400 / 6,300	250,000		7.1 / 3.1	1973	2.3 million approved by ADB Dec. 1973. Construction to begin 1975	-	Development of gravity irrigation schemes adapted to delta topography and land tenure ownership patterns including control of salinity intrusion.
(11)	Tiep Nhut	60,000 / 15,900	1,000,000		15.2 / 7.7	Jan. 1975	Pending	7	Integrated salinity control program including improvement of drainage and extension of period of use of fresh water from canals using low-lift pumps.
(12)	Cai San	50,000 / 13,350	300,000		10.2 / 5.2	Jan. 1975	Pending	6	Promotion of low-lift pumping from drainage and irrigation canals to introduce dry-season cropping to areas in delta flood zone now limited to floating rice.
	Others (Thailand)								
(13)	Nong Wai	13,600	100,000		7.6	1971	5 million ADB loan approved Jan. 1975	5	Demonstration of diversified cropping with rice during wet season and with variety of crops in dry season through improvement in design and operation of existing irrigation schemes including use of cooperative associations on marketing and credit.
(14)	Lam Tao	5,000				1973	$1.75 million IBRD loan approved 1974	5	Crop diversification with year-around irrigation including supplemental rice irrigation in wet season.

APPENDIX 8-C

SUMMARY OF AGRICULTURE MASTER PLANNING SPONSORED BY MEKONG COMMITTEE (1976)

(From Reference 7)

Region	Date of Completion	References	Co-Sponsors	Description of Planning Activities
Vientiane Plain	196[illegible]	AR[1/]	ADB	Study identifying eight priority projects within Vientiane Plain.
(Elements of overall development planning for Vientiane Plain by Vientiane Plain Development Authority).	1970	AR	USBR	Feasibility report on pump irrigation potentials.
	1974	AR	ADB, Japan	Construction and initial operation of first priority project at Tha Ngone.
	1[illegible]4	AR	India, France	Feasibility reports on Nak Nao and Thadeua projects. Casier Sud project qualified as pioneer agricultural project.
	1[illegible]4	AR		Preliminary planning on Nam Lino for implementing first phase of pump irrigation project (1,000 ha of total 10,480 ha) using Nam Ngum power including organization of refugees into integrated farming community, at total first phase cost of about $1.4 million.
Mekong Delta	1[illegible]	62	Netherlands	Comprehensive studies undertaken by Dutch Delta Team in 1970, involving 25 man-years professional effort, leading to main report plus 9 Appendices completed in April 1974. Elements of report evaluated in detail include (a) history of evolution of farming in delta, (b) the present agricultural situation (climate, water resources, seawater intrusion, soils, irrigation and drainage, population, socio-economics), (c) scope for agricultural development and development potentials (improved agricultural practices and improved water control), (d) development planning (ultimate development, economics), (e) socio-economics, and (f) needed further investigations.
(Comprehensive programme to establish bases to be used by riparian governments in preparing master plans for delta agricultural development).	19[illegible]	AR	Netherlands	Identification and formulation of five projects suitable for early implementation, namely irrigation projects at Ke Sach (25,000 ha first phase), Can Tho (12,000 ha), Hoang Ly (12,200 ha), and Kieo An (12,200 ha), and a salinity protection project at Quan Long (20,000 ha). Detailed planning proceeding for Ke Sach as the first priority project.
Democratic Kampuchea				
(a) North Phnom Penh Polder	1972	121		Construction of polder including 13 km dikes NW of Phnom Penh.
(Planning for development of 11,100 ha polder of Government of Democratic Kampuchea)	1973	121		Field investigations and pre-feasibility report for 700 ha consolidated area with irrigation and drainage for intensive agriculture including livestock, model village, and fish farm.
	1974	121		Construction of portion of 700 ha project including livestock experimental station and fish farm.
(b) Flood Control Effects	1975	24		Hydrologic analysis using [illegible] model for evaluating effects of Pa Mong flood control on agricultural productivity in lowlands in Democratic Kampuchea including effects on rice cropping, extent of chamkar dry foot cropping areas, and silt deposition by colmatage.
Northeast Thailand	1971	71		Review of topography, population, and present land use using satellite imagery, ground surveys, and existing statistical data to evaluate future land use capabilities in N. Thailand. Results show agricultural productivity of NE is limited under present conditions of exploitation. Means for improvement include watershed management for mountains and hill slopes, raising of livestock and growing of fodder crops in the uplands, and intensive water control and diversified agriculture in the lowlands.
(Preliminary evaluations and planning for increasing regional agricultural productivity)	1974	66		Systems analysis of rainfall in region, resulting in geographical classification of region into areas suitable for lowland and upland crops under rainfed conditions.
	1975	52		Systems analysis of development alternatives in Lam Pao irrigation service area to develop approach requiring minimum capital and credit with maximum employment and returns.
Basinwide Mapping Programme	Underway	18		Preparation of basinwide maps on vegetation, hydromorphology, and land use, based on satellite imagery and other data.
(Portrayal of resources of lower basin pertinent to agricultural development)	Underway	18		Delineation of ecological zones of lower basin representing areas having common ecological/agricultural characteristics based on consideration of climate, rainfall, evapotranspiration, hydrology, and soil types.

Notes: 1/ Annual Reports of Mekong Committee.

APPENDIX 9

Proposed Expanded USA Commitments to the Mekong Committee Programme

Development Loans	(1,000 US$)
Drayling Tributary Project	4,500
Hydro-Electric Project in Laos	5,000
Pa Mong	65,500
Development Grants	
Mekong Basin Development Planning	11,000
Mekong Pioneer Agricultural Projects	10,000
Battambang Multi-Purpose Irrigation Project	4,000
	100,000

Source: EAST ASIA Regional Field Budget Submission for FY 1976 submitted to AID/Washington August 1974.

APPENDIX 10

PROJECT APPRAISAL REPORT TEAM

(A) Chairman: Mr. James Hanks, RED Bangkok

(B) Team Members:

(1) Mr. Robert Halligan, Deputy Program Officer, USAID/Manila - involved with Mekong Project as Far East Regional Desk Officer(1962-1965), as Free World Assistance Officer responsible for *inter alia* regional activities in Vietnam including Mekong activities(1965-67), as Regional Program Officer, RED/Bangkok(1967-72), and as Regional Program Officer, RED/Bangkok (1974).

(2) Mr. James R. Callaway, AID Regional Engineering Officer for regional development activities of USAID/RED Bangkok, USAID Korea, USAID India, AMEMB Burma, and USAID Sri Lanka, with experience in project appraisal reporting for projects in Vietnam(1968-72) and in Korea (1976-77).

(3) Dr. Harvey F. Ludwig, Consulting Engineer, Bangkok, expert in the field of water resources and environmental engineering and Member of the National Academy of Engineering of the USA, with 39 years professional experience including approximately 10 years on assignments in developing regions in Asia, Africa, the Middle East, and South America, including service as special consultant to the Mekong Committee/ Secretariat in 1974-77.

APPENDIX 11

LIST OF MEETINGS OF THE MEKONG COMMITTEE SINCE 1959

(P = Plenary Meeting; S = Special Meeting;
E = Extraordinary Meeting; C = Communique)

Session	Place			Document series no. (E/CN.11/WRD/MKG...)	Date of Report
1(S)	Phnom Penh	31 Oct-1 Nov	1957	R. 1	5 Nov 1957
2(S)	Bangkok	19-21 Feb	1958	R. 3	21 Feb 1958
3(S)	Saigon	23-26 May	1958	R. 6	26 May 1958
(S)	Bangkok	15-18 Dec	1958	R. 9 (summary of conclusions)	18 Dec 1958
(S)	Bangkok	15-18 Dec	1958	R. 10 (proceedings)	26 Dec 1958
4(S)	Vientiane	27 Feb-4 Mar	1959	R. 14	4 Mar 1959
5(S)	Saigon	16-19 June	1959	R. 15	15 July 1959
6(S)	Phnom Penh	15-19 Oct	1959	R. 20	17 Nov 1959
7(S)	Bangkok	6-11 Jan	1960	R. 23	3 Feb 1960
8(S)	Bangkok	16-17 Feb	1960	R. 25	22 Feb 1960
9(S)	Bangkok	11-21 Mar	1960	R. 27	25 Apr 1960
10(S)	Bangkok	3-4 May	1960	R. 30	15 Dec 1960
11(S)	Vientiane	23-26 Nov	1960	R. 32	30 Mar 1960
12(S)	Saigon	22-27 Feb	1961	R. 36	28 Mar 1961
13(S)	New Delhi	13-27 Mar	1961	R. 41	21 June 1961
14(S)	Bangkok	31 May-2 June	1961	R. 46	17 July 1961
15(S)	Bangkok	18-20 Oct	1961	L. 51	7 Dec 1961
16(P)	Phnom Penh	3-8 Jan	1962	L. 60 Rev. 1	12 Jan 1962
17(S)	Tokyo	7-26 Mar	1962	L. 63 Rev. 2	2 Apr 1962
18(S)	Bangkok	8-10 May	1962	L. 66 Rev. 1	15 May 1962
19(P)	Vientiane	8-14 Jan	1963	L. 75	21 Jan 1963
20(S)	Manila	6-20 Mar	1963	L. 80	20 Mar 1963
21(S)	Bangkok	22-24 May	1963	L. 83	20 June 1963
22(S)	Saigon	2-24 Nov	1963	L. 115	20 Dec 1963
23(P)	Bangkok	7-13 Jan	1964	L. 118 Rev. 1	15 Jan 1964
24(S)	Teheran	3-21 Mar	1964	L. 120	20 Mar 1964
25(S)	Bangkok	23-25 Sep	1964	L. 127	23 Oct 1964
26(P)	Saigon	6-11 Jan	1965	L. 135	13 Jan 1965
27	Wellington	16 Mar-3 Apr	1965	L. 147 Rev. 1	26 Apr 1965
28(E)	Bangkok	10-11 May	1965	L. 151	25 Aug 1965
28(C)		-		L. 149 Rev. 1	-
29(S)	Vientiane	12-13 Aug	1965	L. 157	26 Sep 1965
30(S)	New Delhi	17 Mar-11 Apr	1966	L. 168 Rev. 1	18 Apr 1966
31(P)	Vientiane	1-6 Feb	1967	L. 188	6 Feb 1967
32(S)	Tokyo	3-17 Apr	1967	L. 201 Rev. 1	17 Apr 1967

Session	Place			Document series no. (E/CN.11/WRD/MKG...)	Date of Report
33(S)	Vientiane	12-13 Oct	1967	L. 214 Rev. 1	26 Oct 1967
34(P)	Bangkok	11-15 Jan	1968	L. 224 Rev. 2	16 May 1968
35(S)	Canberra	17-30 Apr	1968	L. 231 Rev. 1	16 May 1968
36(S)	Bangkok	5 July	1968	L. 236 Rev. 1	13 Sep 1968
37(S)	Bangkok	11-13 Sep	1968	L. 242	17 Sep 1968
38(P)	Saigon	20-27 Jan	1969	L. 256	27 Jan 1969
39(S)	Singapore	15-28 Apr	1969	L. 263	28 Apr 1969
40(S)	Locarno	13 July	1969	L. 278	22 July 1969
41(E)	Vientiane	24 Aug	1969	L. 283	29 Aug 1969
42(S)	Bangkok	11-13 Sep	1969	L. 287	13 Sep 1969
43(S)	Bangkok	28 Oct	1969	L. 289	28 Oct 1969
44(S)	Vientiane	22 Nov	1969	L. 294	26 Nov 1969
45(P)	Phnom Penh	9-13 Feb	1970	L. 301	13 Feb 1970
46(S)	Bangkok	14-27 Apr	1970	L. 307	28 Apr 1970
47(S)	Bangkok	25-26 June	1970	L. 310	26 June 1970
48(S)	Vientiane	5-7 Oct	1970	L. 316	14 Oct 1970
49(S)	Bangkok	16 Nov	1970	L. 319	18 Nov 1970
50(P)	Vientiane	27 Jan-1 Feb	1971	L. 324	1 Feb 1971
51(S)	New York	11 Mar	1971	L. 325	15 Mar 1971
52(S)	Manila	20-30 Apr	1971	L. 328	1 May 1971
53(S)	Saigon	29 Sep-1 Oct	1971	L. 336	1 Oct 1971
54(S)	Vientiane	1-2 Dec	1971	L. 339	2 Dec 1971
55(P)	Bangkok	26-31 Jan	1972	L. 347	31 Jan 1972
56(S)	Bangkok	15-27 Mar	1972	L. 349	31 Mar 1972
57(S)	New York	30 May	1972	L. 351	18 Oct 1972
58(S)	Bangkok	12-17 Oct	1972	L. 354	17 Oct 1972
59(S)	Vientiane	28 Nov	1972	L. 357	28 Nov 1972
60(P)	Saigon	17-23 Jan	1973	L. 363	28 Jan 1973
61(S)	Bangkok	1 Mar	1973	L. 366	1 Mar 1973
62(S)	Tokyo	11-23 Apr	1973	L. 370	23 Apr 1973
63(S)	Bangkok	24-26 Oct	1973	L. 380	1 Nov 1973
64(P)	Bangkok	30 Jan-4 Feb	1974	L. 390	11 Feb 1974
65(S)	Colombo	27 Mar-8 Apr	1974	L. 392	8 Apr 1974
66(S)	Saigon	6-10 June	1974	L. 396	10 Jan 1974
67(S)	Vientiane	6-11 Nov	1974	L. 399	11 Nov 1974
68(P)	Vientiane	29 Jan-3 Feb	1975	L. 405	3 Feb 1975
69(S)	New Delhi	26 Feb-7 Mar	1975	L. 408	7 Mar 1975

Source: Mekong Secretariat, February 1977.

APPENDIX 12-A

APPLICATIONS OF MODELLING FOR LOWER MEKONG BASIN PLANNING

(from Reference 7)

Model	Purpose	Original Development	References	Notes
SSARR	Hydrologic model [illegible] planning/design and operation of [illegible] control projects, and (b) [illegible] ting.	By U.S. Corps of Engineers for Columbia River Basin (USA).	20, 21, 22	Considers basin to comprise 3 sets of conceptual storages (surface, subsurface, ground water), estimates inflows (considering rainfall, evaporation, evapotranspiration, soil moisture), routes these through basin to obtain combined flow as basin runoff.
DELTA	Hydrologic model [illegible] evaluating proposed delta development schemes including analyses of dredging.	By SOGREAH for hydrologic studies of Mekong delta.	26	Delta divided into 293 small geographic units or meshes with hydraulic links. Predicts delta water stages and flows under influence of upstream inflows and of local rainfall. Calibration considered sufficient for all but low flows.
HYSIM	Evaluation of Pa Mong project and downstream effects, and of other projects, including simulation of multipurpose operation.	By U.S. Corps of Engineers for simulating river basin power generation and flood control characteristics together with other purposes.	23, 24, 25, 28	Determines storage to be put into or released from each reservoir in system to obtain maximum net economic benefits, where hydroelectric power generation is prime objective. For tributary projects the HEC-3 model may be more useful (where other purposes are equally important).
MASS	Systematic analysis of irrigated agricultural projects in lower basin including Lam Pao (Thailand).	By TAMS for application in other countries, now being tailored to lower basin conditions.	25, 27	Model input includes all variables affecting rainfed and irrigated agriculture (technical and economic). Basic assumption in project analyses is to optimize economic benefits as well as farmer's benefits for the given constraints in land, labor, and capital.
CSIIFLO	Economic evaluation of power system alternatives in lower basin.	By Mekong Committee for power evaluations using wide range of discount rates.	23	For given size of power plant and completion schedule, cash flow expenditures are computed from different power system alternatives. Expenditure is then discounted to present value using different internal rates of return.
HIGHHEAD	Development of optimum scale of project with reservoir characteristics and economic factors as input data, so as to maximize power and minimize spill for each selected high water level.	Mekong Secretariat as tool for analyzing water resources projects on Mekong river tributaries	29	Programme components include modules to synthesize streamflow data, to compute usable flow versus net storage, to compute usable firm flow for irrigation versus net storage, and to compute surcharge storage versus spill.
TIDAL	Prediction of tidal effects on river discharges through main channels of Mekong estuary. Results check with those obtained from salinity studies.	Netherlands Delta Development Team for the Mekong Committee.	29	One-dimensional hydrodynamic model in which equation of continuity and dynamic equation are expressed in terms of finite differences. The equations for differences form a system of linear equations which are simultaneously solved to determine water levels and discharges at each river section.
WASP	Determination of optimum power system with user specified constraints, considering nuclear and all other possible power sources. Used for analysis of Pa Mong alternatives.	International Atomic Energy Agency for conducting nuclear power planning studies for IAEA member countries. This is advanced version of programme originally developed by TVA in United States.	29	WASP package consists of group of six interrelated programme modules which may be operated sequentially in single runs or individually. These are the LOADSY module (peak loads, energy requirements, load duration), FIXSYS module (system characteristics), VERSYS module (expansion alternatives), CONGEN module (expansion configurations), MERSIM module (system operation), and DYNPRO module (schedule for new units).

Note : Computers used by the Mekong Secretariat include the IBM 360/40 computer at National Statistical Office of Thailand, the CDC 3100/3300 computer system at the Bangkok Data Centre, and the CDC 3600 computer system at the Asian Institute of Technology.

APPENDIX 12-B

COMPUTER USAGE BY THE MEKONG SCRETARIAT

(U.S. Input Approximately 54 Per Cent of Total)

YEAR		NSO (IBM360/40)	BDC (CDC3100)	AIT (CDC3600)	TOTAL
1968	Expenditure (US$)	-			47,971 1/
	Time (hr)	-			626
1969	Expenditure (US$)	49,334			49,334
	Time (hr)	513			513
1970	Expenditure (US$)	51,707			51,707
	Time (hr)	538			538
1971	Expenditure (US$)	54,644			54,644
	Time (hr)	569			569
1972	Expenditure (US$)	48,885	4,446		53,331
	Time (hr)	509	74		583
1973	Expenditure (US$)	53,743	18,237		71,980
	Time (hr)	551	304		855
1974	Expenditure (US$)	36,475	29,059	5,971	71,505
	Time (hr)	354	493	60	907
1975	Expenditure (US$)	4,433	10,387	18,169	32,989
	Time (hr)	42	173	149	364
1976	Expenditure (US$)	1,542	5,575	20,785	27,902
	Time (hr)	9	92	129	230
TOTAL	Expenditure (US$)	300,763	67,704	44,925	461,363
	Time (hr)	3,085	1,136	338	5,185

Note : 1/ : Rental of IBM Machines
NSO : National Service Office
BDC : Bangkok Data Corporation
AIT : Asian Institute of Technology

APPENDIX 13

SUMMARY OF FISHERY BASIC DATA AND RELATED STUDIES IN LOWER BASIN SPONSORED BY MEKONG COMMITTEE
(from Reference 7)

Name of Study	Dates	References	Collaborating Agencies	Status	BRIEF REVIEW OF STUDY FINDINGS
Pa Mong Pre-Impoundment Survey	1967-68	30	USBR	Completed	Surveys made over 100-km stretch of river near Pa Mong. Total of 139 fish species found, with cyprinides or carps as the dominant group (67 species), followed by catfish. Many of these believed capable of adjusting to reservoir environment. The 100-km river stretch yielded commercial harvest of 2,300 tons/year, the fishing season being during the rainy season, with 3,500 families involved. Most of the fishermen were part-time (79%).
Basinwide Survey-Study Plan	Report 31 Dec. 1972	31	USAID	Completed	Report presents summary of all known information about fisheries in lower basin and outlines proposed four-year 1.5 million study for obtaining additional data for establishing necessary minimum data base for evaluating effects of Pa Mong and other water resource development projects.
Basinwide Survey-Study	Started 1 Jan. 1974	45	USAID	Underway	First year of effort devoted to mobilization and field work in estuarine/marine zones, with work in Thailand and Lao PDR initiated in second year. Progress reports present detailed data on physical-chemical findings; fish distribution, abundance, and diversity; fish life histories; aquaculture; fish marketing; and local fishing practices. No conclusions yet drawn, the work being limited thus far mostly to data collection.
Great Lake Study	Approved 1969	39		Pending	Detailed study (500,000) of fisheries ecology of Great Lake system to furnish basic data needed for assessing effects of proposed water development projects. To be implemented when access to area is permitted.
Hydro-Biological and Socio-Economic Survey	Approved 1971	40		Partially underway	Proposed field studies at selected tributary reservoirs (including Nam Pong and Nam Ngum) for monitoring post-impoundment fisheries and related limnology for purpose of establishing guidelines for effective fisheries management at tributary and mainstream reservoirs including extent of vegetative cover to be moved from reservoir area, need for imported species, proper zones for water withdrawals, etc. Project only partially implemented but is gradually getting underway.
Nam Pong Fishery Studies:					
(1) Basic Data	1965-66	32	Thai DF	Completed	Pre-impoundment and post-impoundment evaluation of fishery at Nam Pong. Findings include information on numbers of fish species (reduced from 74 to 51 by impoundment), standing fish crop (increased 50%), predominant species, physical-chemical condition , and water weeds. Predatory murrels increased while carps decreased in relative numbers, and recommendations were developed for reestablishing a more favourable forage ratio.
(2) Socio-Economics/ Fishery Management	1970-71	37		Completed	Socio-economic studies completed in 1971 included evaluation of catching, hauling, processing, and marketing. Detailed analyses made on comparing incomes of types of workers involved from fish catching to marketing and recommendations developed for planning and supervision of fishing settlements, for assuring proper share of benefits to fishermen, and on reservoir fishery management procedures.
Nam Ngum Fishery Studies:					
(1) Basic Data	1972-73	33, 41	Lao DF, USAID	Completed	Preliminary fishery surveys followed by periodic surveys made at five stations in reservoir including physical, chemical, and biological parameters. Water temperature, DO, and pH measured at every metre depth to 15 m then at 5 m intervals to bottom. Plankton analysed every 5 m. From 3 to 6 surveys made at each station. See discussion on aquatic biology for further limnological studies.
(2) Fishery Management	1969-75	34,35,36, 42,43,44		Underway	Four-year project to prepare for controlled exploitation of fisheries at Nam Ngum including preparation of detailed plan for maximising fish production (completed), implanting the reservoir with selected new fish species (completed), development of proposed fishing regulations (completed), and a pilot programme of monitoring and experimentation to demonstrate methodology for achieving maximum sustained yields of desirable fish species (proposed).
Prek Thnot Fishery Management	Approved 1969	38		Pending	Programme for achieving maximum fish production from Prek Thnot reservoir in Democratic Kampuchea including construction of fish rearing facility, training, removal of vegetative cover, weed survey in reservoir basin, construction of fish harbor, fish implanting, and organization of marketing.

APPENDIX 14

SUMMARY OF SOCIO ECONOMIC BENCH MARK SURVEYS SPONSORED BY MEKONG COMMITTEE

(from Reference 7)

No.	Name (Country)		Type of Community	Year Started/ Completed	Cooperating Agencies	Reference (in Addition to Mekong Committee Annual Reports)	No. Families Affected	No. Families in Sample	Family Size: Total	Family Size: Children	Family Size: Adult Workers	Family Size: Elders	Average Size Farm, ha	Paddy Production tons: Per ha	Paddy Production tons: Per family	Av. Family Income (year): Total	Av. Family Income (year): Rice	Debt	Committed to rainfed rice cultivation	Ave. rice family consumed
1	Nam Pong (T)	(a)	Resettlement villages at Nam Pong/Non Sang	1966/68	Thai National Statistical Office															
		(b)	Irrigation (Nong Wai)	1967/69	RTG. Dept. Land	46		317	7.0				1a rai	1.2	3.0	Bt 8,[illegible]5		Bt 4,[illegible]	[illegible]	50 %
		(c)	Electric power impact	1967																
		(d)	Social studies	1967/68	USOM, USBR															
		(e)	Fisheries	1970/72																
		(f)	Resettlement pilot project	1974/75	Netherlands	54	479	230	6.4	2.8	3.5	0.1	23.2 rai						[illegible]	
2	Pa Mong (T/L)	(a)	Irrigation area	1966	USBR, USOM, NEA		1,500													
		(b)	River fishing area	1967/68	RTG		3,451		7.0											
3	Vientiane Plain (L)	(a)	Irrigation area	1971/72			3,000													
		(b)	Irrigation area	1966																
4	Phetchaburi and Suphanburi (T)		Irrigation areas (existing)		USBR		500													
5	Lam Dom Noi/Nam Don (T)		Resettlement	1970			1,000													
6	Prek Thnot (C)		Pioneer agriculture project	1970/70	Netherlands	49	2,750						2.65			9,100 riels $ 165		2,156 riels	No	Most
7	Kalasin (T)		Experimental farm	1969/70	Indonesia, NEDB	48		200						291.5 rai		Bt 8,767		2,887 b	Yes	52 %
8	Mekong River		Pump irrigation	1971/72	NEA															
9	Cai San (SVN)	(a)	Pioneer agriculture	1971/73	University of Can Tho	47			6.7	3.4	3.0	0.3	2.6	67.4 gia		Piastres 131,[illegible]			Yes	47 %
		(b)	Out-of-School youth project	1973	World Council of Churches	47														
10	Lam Pao (T)		Tributary irrigation project	/72																
11	Muk Kompoul (C)		Pioneer agriculture project	1972/75	Democratic Kampuchea Dept. Agriculture															
12	Nak Nao (L)		Nam Ngum irrigation	1972/75				200												
13	Go Cong (SVN)		Pioneer agriculture	1974	University of Can Tho															
14	Tha Ngone (L)		Irrigation	1974/75	Government Lao PDR	50		100	7.6	50.5 %	47.2 %		6.2	4.2		$ [illegible]	$ 2[illegible]	$ 4[illegible]	[illegible]	

APPENDIX 15

SUMMARY OF AGRO-INDUSTRIAL STUDIES SPONSORED BY MEKONG COMMITTEE

(from Reference 7)

Industry	Period of Study	Reference No.	Area Studied	Summary of Industrial Feasibility Studies	Follow-up Activities
Agro-Input Industries					
Agricultural Machinery	1965-74	74, 75, 76, 88	Lower Basin	Local manufacture of farm machinery should be encouraged by government support of selected [illegible] already capable of manufacture, including low interest loans and setting of local standards [illegible] financial support of national institutes preferred to importing of new riparian research [illegible]	
Nitrogen Fertilizer	1965-74	74, 75, 76, 88	Lower Basin	Only Thailand and Democratic Kampuchea now produce chemical fertilizer which meet only part of their requirements, the former producing [illegible] plants and the latter producing [illegible] nitrate and the latter producing [illegible] phosphate. Widescale use is still and subject to [illegible] vegetable and fruit growing [illegible] programme involves establishing a complex fertilizer plant using both imported and local [illegible] local packaging, but in the long-range nitrogen fertilizer can be produced locally [illegible] with In Viet-Nam both the short-range and long-range [illegible] based on production from [illegible] to the completed in 1966 indicate good potentials for local manufacture of nitrogenous fertilizer [illegible] electric power provided such power would be available at no more than [illegible] mills per kWh. Another study [illegible] in 1967 indicates low-cost power would favor establishing a calcium carbide industry as a basis for [illegible] many other chemicals including urea.	[illegible] potential for a regional fertilizer industry [illegible] meeting the needs of [illegible] agriculture but such a project would be capital intensive and be a large scale undertaking [illegible] would probably have to be a regional enterprise [illegible] the objective is to be [illegible] the [illegible] countries in collaboration with [illegible]
Phosphoric Acid	1967-74	77, 78, 79	Lower Basin	Availability of electric power and local raw materials at reasonable cost make this potential industry attractive for lower basin. A plant at a coastal location comprising phosphorus smelting and acid production, producing 200,000 tons P_2O_5 annually (PO_5 acid) with two 70 MW smelting furnaces, would require total fixed investment of 42.5 million.	Report being evaluated by private sector. Further studies needed based on detailed estimates of costs for raw material [illegible].
Agro-Output Industries					
Animal Feed Industry	1974-75	88		This industry is central to the development of the agro-industrial sector; industry integrates raw material producer, farmer, feed mill, and meat processing plants. Introduces byproduct possibilities [illegible] to develop feedstock and livestock industries tied to need to provide low priced protein and to [illegible] higher value exports. All riparian countries interested in development of the industry. Problems: quality control, price controls currently hurting industry. Integration of feed and livestock industries key approach. Eg. private sector in Thailand (1) Charoen Pokphand (chickens), (2) Kasetchai Lusuri (swine), and (3) Chokchai (cattle).	Lao animal feedstock livestock plan under development. Construction [illegible] water house by New Zealand government [illegible] part of plan. Development is integral part of plan. Development of integrated pig [illegible] complex by Kasetchai Lusuri, private sector, Bangkok.
Fruit and Vegetable Processing	1974-75	88	Lower Basin	Experience in establishing new fruit and vegetable processing factories in north Thailand indicates very good potentials in lower basin because of steadily increasing world demands, suitability of soils and climate, and increasing availability of soils and climate, and increasing availability of irrigation. Such operations should start at limited scale and expand as experience demonstrates how to handle many difficult problems including modified cultivation practices and coordination of farmers and processing activities. The best potentials are in freezing/dehydration which reduce packaging and shipping costs much more than canning.	A number of new industries are now being established in northern Thailand which should assist in developing similar projects in lower basin.
Kenaf	1975-76	90	Lower Basin	Study results indicate it would be feasible to establish series of pulp/paper mills in lower basin using locally grown kenaf as raw material, each with capacity of 70,000 tons pulp/year and supporting about 50,000 families. Six mill sites were selected in the lower basin area, for which adequate quantities of kenaf whole stock, chopped stalk, and bast ribbon can readily be made available within economic haul distances. One or more pilot kenaf demonstration farms are recommended for extension training purposes. A mill for pulping kenaf would be almost identical in extent to a bagasse or straw pulp mill.	
Pineapple	1974-75	80, 81, 88	Lao PDR	Good prospects for pineapple production and canning in the Lao PDR, because of favorable soil and climate and increasing world market, major question is whether export is feasible because of underdeveloped infrastructure and high transport costs to shipping points. Operations should begin at small scale ([illegible] million investment) using 1,500 ha cultivation to produce 500,000 cases annually to develop experience before expanding, at location near port of exit, e.g. Pakse.	In-depth feasibility study recommended especially for projecting [illegible] steps taking into account the [illegible] time needed for establishing the [illegible]

APPENDIX 15

SUMMARY OF AGRO-INDUSTRIAL STUDIES SPONSORED BY MEKONG COMMITTEE (CONTINUED)

(from Reference 7)

Industry	Period of Study	Reference No.	Area Studied	Summary of findings of preliminary/feasibility studies	Follow-up activities
Agro-Output Industries Poultry	1974-75	82, 88	Lao PDR	Accelerated development of poultry raising appears very attractive in the Lao PDR because there is large local need for protein, and soil and climate are favorable for soybeans/groundnuts needed to produce feed cake (as byproduct of vegetable oil industry) which will be equally valuable for pork as well as chickens. Establishment of industry will require coordination of financing feed milling, meat processing, breeding and hatching, and marketing with training in feed and poultry technology.	This programme is to be incorporated into the Lao plan for integrated feedstock/livestock programme.
Pulp and Paper	1974-75	83, 88	Lower Basin	Although the market for paper products will become large in the lower basin, there are insufficient wood resources (except possibility Lao PDR) to support a large industry even with low cost power. A medium-sized industry is feasible using existing raw materials which could become a large industry with forest plantations of conifers operating on sustained yield basis. Also, medium scale industries may be feasible based on use of rubber wood, bamboo, rice straw, and bagasse. Best potentials appear to be for use of kenaf for long fiber pulp in Thailand, for use of bagasse and rice straw in Vietnam for making panel boards, for hardwood pulp mill and pressed board industry in the Lao PDR, and for rehabilitation of bamboo pulp mill in Democratic Kampuchea.	Further studies recommended as pulp and paper situation further evolves. Thailand has approved kenaf plant in northeast and bamboo/bagasse plant near Kanchanaburi.
Sericulture	1972-75	87	Lower Basin	The countries of the lower Mekong basin have been showing increasing interest in reviving, developing, and expanding the sericulture industry to produce domestic raw silk, because of increasing world demand, intensive labor requirements, and low capital investment requirements. The key factors are mulberry leaf cultivation and silk-worm rearing operations. Irrigation should enhance mulberry leaf production (sustained yields throughout the year) which together with improved silk-worm rearing can increase raw silk production from about 20 kg/ha (under rainfed conditions) to as much as 120 kg/ha.	The Mekong Committee with assistance from the Japanese Government is prepared to establish a research centre at Khorat for initial study of "irrigated sericulture" including development of plans for implementing the methods in the pioneer sericulture projects.
Sugar	1972-73	84	Lao PDR, Democratic Kampuchea	Potentials very promising for cane sugar production and processing in the Lao PDR and Democratic Kampuchea because of favorable soil and climate and growing local market. The recommended programme for the Lao PDR starts with plant processing 1,000 tons cane/day (production 11,[illegible] tons sugar in 120 days season), then expanding to 2,000 tons cane/day by 1980 to either with 10,000 litres/day alcohol distillation. In Democratic Kampuchea the need is for 45,000 tons sugar/year for first phase of 45,000 tons/day by 1985, to supplement current palm sugar production.	
Vegetable Oil	1973-74	85, 86, 88	NE Thailand Lao PDR	In northeast Thailand, with irrigation soil and cultivation (soybeans, groundnuts) can be increased sufficiently for vegetable oil plant large enough to be economical utilizing contract farming, e.g., at Khon Kaen, with oil used both locally and exported, and with concurrent development of livestock industry to furnish market for oil cake and meal. For Lao PDR [illegible] in integrating oil seed cultivation, oil milling, [illegible] procurement to main problem hindering development of [illegible]	Further studies in order for industry at Khon Kaen because of favorable transportation and banking facilities, labour availability, and proximity to [illegible] fertile areas.

APPENDIX 16

SUMMARY OF MINERAL DEVELOPMENT SURVEYS SPONSORED BY MEKONG COMMITTEE

Type and Name of Project	Collaborating Agencies	References	Period of Project	Brief Summary of Findings	Follow-up Actions
(A) FIELD EXPLORATIONS					
(1) Survey of minerals in Northeast Thailand	UNDP, USGS, DMR Thailand	103, 105, 112, 113, 114	1963-68	Survey comprised examination of magnetic anomalies indicated by earlier aeromagnetic surveys plus explorations for rock salt at Chaiya Phum, and resulted in finding of small iron ore deposits, vast rock salt deposits, and many other mineral prospects especially lead and zinc.	Thai DMR has followed up copper findings by exploitation through private enterprise (1966-67).
(2) Survey of minerals in Lao PDR	UNDP, BRGM	106, 110, 113, 114	1966-69	Explorations for iron ore (based on aeromagnetic anomalies) in north-central Lao PDR and in Salakhan – Pak Lay area failed to find any worthwhile ores. Similarly no valuable coal deposits were confirmed in the "coal basin" northeast of Vientiane.	Study pointed up need for basic information as a guide for planning mineral exploration in Lao PDR.
(3) Bauxite reconnaissance	BRGM	96, 97	1962-63	Bauxite deposits established in Democratic Kampuchea, one at Haut Chlong plateau being of possible economic interest, but follow-up investigations needed. Because of insecurity the survey work could not be carried out in key areas of the Lao PDR and Viet-Nam (this remains to be done).	Follow-up explorations planned when security permits; meanwhile question of availability of bauxite ore is unresolved.
(4) Geological and geochemical mapping in Loei province (Thailand) and western Lao PDR	IGS	98, 107, 108, 109, 111	1964-68	Work included study of lead and zinc deposits in Loei province. Explorations in Lao PDR at Salakhan – Pak Lay, Sayaboury, and Ban Houei Sai were not conclusive and indicated need for assessing geology of this region with decision to proceed with photogeological mapping.	Again, better basic information on geology needed for planning field exploration.
(5) Photogeological mapping of northern Lao PDR	IGS	119	1969-74	Series of 13 maps at scale of 1:250,000 prepared for northern Lao PDR (area of 110,000 km^2, or 47 % of country), finished in 1974, which furnish a substantial basis for planning future field mineral explorations. Work done by photointerpretation of 1:40,000 scale aerial photography from U.S. Army Map Service.	These maps to be used in planning further mineral exploration in Lao PDR.
(6) Potash explorations in northeast Thailand and in Lao PDR.	USGS	102, 104, 120	1970-75	Drilling program has established presence of very high grade potash deposits in Vientiane plain which appear to be among the world's best with potentials for capturing much of SE Asia market. Drilling in Udorn Salt basin in northeast Thailand shows vast potash deposits in that vicinity but of lesser quality than in Lao PDR. Similar rich deposits likely exist in Savannakhet plain of Lao PDR and Khorat salt basin.	Drilling program continuing. Assistance to be given to riparian governments to exploit these potentials.
(B) PROJECTS FOR COLLATING/SUMMARIZING DATA					
(7) Summary of Mekong Committee programme (1970)	–	99 (No. 27)	1970	Chronological compilation of all Mekong Committee – sponsored activities on mineral development in lower basin.	
(8) Summary of known information on mineral resources in lower basin	–	99 (No. 26)	1970	Compilation of all known information on mineral resources of lower basin organized by 25 different categories of minerals for each of the four riparian countries.	
(9) Card index	ESCAP	117	1969	Joint ESCAP/Mekong Committee programme for continuing compilation of all available information on mineral resources in lower basin.	Continuing activity.
(10) Geological data summaries	IGS, ESCAP	115, 116, 117, 118	1972-73	Compilation/collation of basic information in lower basin on stratigraphy, geology, and mineral resources.	
(11) Geological/mineral map	–	99 (No. 27)	1969-70	Compilation partially completed of geology/minerals of lower basin comprising six sheets at scale of 1:1 million.	
(C) METAL PROCESSING STUDIES					
(12) Aluminum	–	93, 94, 95	1969-75	Studies indicate feasibility of aluminum ingot plant in Democratic Kampuchea, using local or imported ores, for meeting local and regional needs, with power consumption of 250,000 kW.	
(13) Iron and steel	UNDP, ESCAP, UNIDO	91, 100, 101	1970-71	Regionally integrated system of steel mills recommended comprising smaller rolling mills in each country plus specialized mills in one or two countries. Total power consumption by 1985 estimated at 210,000 kW.	
(14) Ferro-alloys	UNIDO	92	1972	Prospects good for electric smelting of ferro-manganese/ferro-silicon for regional market, using 200 million kWh power annually, made from local ores of manganese and quartzite.	

APPENDIX 17

SUMMARY OF STUDIES ON RESETTLEMENT RELATING TO PA MONG

No.	Short Name of Study	Authors	Ref. No.	Year Completed	Sponsor	Subject of Study
1	Land Settlement in Northeast Thailand	Thomas and Block	163	1970	USAID	Constraints in applying resettlement principles to lower Mekong basin.
2	Tributary Resettlement Projects in Northeast Thailand	R. Ben-Nun	164	1971	MC	Problems experienced in tributary resettlement projects.
3	Costs of Resettlement in Ghana and Northeast Thailand	B. Ross	179, 181	1972	USAID	Review of resettlement costing practices in Ghana and Northeast Thailand
4	Aerial Photography for Resettlement Planning	Mekong Committee	165	Aug. 1972		Aerial photography as alternative to ground surveys for assessing village development.
5	Quae Yai Resettlement Review	AIT	179, 180	1972	ECAT	Preliminary evaluation of anticipated problems for project in western Thailand.
6	Lam Dom Noi Resettlement Study	C. Tohtong Mekong Committee	166, 167	1970-72	MC	Review of situation at Lam Dom Noi before and after resettlement.
7	Pa Mong Resettlement Costing Project	Mekong Committee	168, 169, 170, 171, 172, 188.	1976	MC	Detailed evaluation of costs involved in resettlement including consideration of all feasible resettlement alternatives.
8	Resettlement Study and Planning Project	Mekong Committee	173, 174, 175, 176, 185, 186.	1976	MC	Development of methodology for resettlement planning and implementing pilot demonstration within existing resettlement scheme.
9	Nam Ngum Resettlement Project	Mekong Committee	177, 178, 182	Started 1975	MC	Assistance in solving resettlement problems at tributary project.
10	Estimation of Resettlement Costs	Netherlands Economics Institute	187	1975	MC	Methodology for estimation financial, economic, and social costs of resettlement.

APPENDIX 18

AAG/EA AUDIT REPORT OF 21 MARCH 1977

We have completed an audit survey of the activities under the Regional Economic Development Project No. 498-15-120-220, Mekong Basin Development Planning. Our audit survey was made in accordance with your request on February 18, 1977 for a final Audit of this project.

Our survey work included discussions with RED's project manager and a review of pertinent project files in the RED office, Mekong Committee published reports concerning project activities, and the USOM Controller's financial records. We also studied your recent draft Project Appraisal Report(PAR) and technical evaluation of the U.S. Government's contribution over the 20-year period 1957-1977. Your evaluation included activities partially funded with Mekong Development Planning Project grant funds.

As a result of our audit survey, we believe that further audit work is not required. We have based our decision on the following. The well prepared project appraisal report and Logical Framework Matrix provided a historical presentation of the U.S. contribution to the Mekong Committee and its Secretariat. Measurement of project goal achievement and Mekong Committee/Secretariat performance was made by an evaluation team of two RED staff (One former now with USAID/Philippines), one engineer form USAID/Korea, and an outside consulting engineer familiar with the Mekong program.

Mekong Committee financial status reports and Price Waterhouse & Co. annual audit reports to the Committee on U.S.A. contributions, expenditures and refunds have provided RED with continual financial coverage. The latest Price Waterhouse & Co. audit report dated December 2, 1976 included transactions for the year ended June 30, 1976. This report included a certification that grant funds were utilized in accordance with the Letters of Agreement.

Two prior audits of this project made by the AAG/EA office did not disclose major deficiencies. The latest report, No. 8-498-76-7 dated August 18, 1975 included obligations of $6.1 million and audited expenditures totaling $5.7 million. Project funds were deobligated following the restrictions placed on funding activities in Indochina on July 1, 1975. Currently cumulative obligations and disbursement total $5.8 million. Therefore 98% of project funds have been audited.