メコン河開発諮問委員会
第8回会議議事録

（昭和45年12月9日開催）

昭和45年12月

海外技術協力事業団
開発調査部

はしがき

メコン委員会は拡大流域計画草案（Draft Amplified Basin Report）の完成を期として、本年11月9日から16日までの8日間バンコクにてその報告書草案討議のためのセミナーを開催した。

本邦からこのセミナーに安芸皎一・久保田豊氏など4氏が出席したが、セミナーの概要や問題点などについて報告を聴取し、併せて今後のメコン河開発に対する日本の協力方針などについて討議するため、12月9日ホテル ニュー・オータニにて第8回メコン河開発諸問委員会が開催された。

本書では、出席者各位の発言の概要を収録するとともに、当日配布されたメコン開発資料（1～3）を付録として添付した。

I. 会議の概要

1. 日時および場所：

昭和45年12月9日（水） 午後2時～4時

ホテル ニュー・オータニ 16階 紫雲の間

2. 議題：

(1) メコン河拡大流域計画セミナーの報告について

(2) 今後のメコン河開発調査方針について

(3) その他

3. 出席者：

委員長	井上五郎	動力炉・核燃料開発事業団理事長
委員	安西正夫	昭和電工株式会社社長 （同社電気部長 中村明氏が代理出席）
〃	大堀弘	電源開発株式会社総裁 （同社 高橋理事が代理出席）
〃	渋沢信一	海外技術協力事業団顧問
〃	小倉武一	アジア経済研究所所長（欠席）
〃	高杉晋一	海外経済協力基金総裁 （同基金 沖田理事が代理出席）
〃	久保田豊	日本工営株式会社社長
〃	田付景一	海外技術協力事業団理事長
事務総長	安芸皎一	海外技術協力事業団顧問
事務次長	徳野武	海外技術協力事業団参与
幹事	吉田良三	日本工営株式会社技師長
オブザーバー	伴正一	外務省経済協力局技術協力課長 （技術協力課 岡田、安達両事務官が代理出席）

オブザーバー	市浦　繁	前ECAFE事務局員
〃	武田健策	農林省

なお、海外技術協力事業団から寺岡・中西両理事、階堂開発調査部長、新家実施課長および関係職員が出席した。

Ⅱ. 出席者の発言要約

（敬称略）

（井上）

約1カ月前にメコン委員会の主催による拡大流域計画報告書草案（Draft Amplified Basin Plan Report）についてバンコクでセミナーが開催され、日本からは安芸氏、久保田氏などが出席された。この流域計画が将来基本的な計画となるようであり、わが国としてもこれにどのように対処したらよいか皆様と話し合ってみたいと思う。

先ず、そのセミナーの模様や討議の内容などについて報告を拝聴したい。

（新家）

（配布資料―付録1にもとずいてセミナーの概要を説明）

（井上）

このセミナーのレポート（付録2）が本日配布されているが、これに特に注意する点は？

（安芸）

セミナーの目的は、このBasin Plan Reportについて広範な意見の交換を行なうということにあった。このBasin Planは当初ECAFE事務局が資料の極めて少い段階からスタートしたものであるが、その後種々の新しい事柄が出て来て、1962年にこのBasin Planを再検討したらという要望が出た。そしてこのたび8年目で完成した訳である。

このセミナー・レポートではBasin Plan Reportの種々の問題について言及してあるが、その2，3をあげると、○失業問題―underemploymentという語を使用している―、住民の生活水準格差の是正、沿岸各国におけるnational Planとinternational Planとの関連、など流域外のものも含めて種々の問題がある。

○また、これまでのように水資源開発のみをベースにするのではなく、前述の問題と社会的な関連で農業、工業、鉱物などを含めて開発を考えるべきであ

る。

○さらに、environmentの問題（ダム建設の魚族に与える影響、Great Lakeにおける魚の減少）、上流部の開発がもたらす土砂の堆積、なども慎重に考慮を要する。

また、本・支流開発の基本方針として1970年代は支流プロジェクトに重点をおき、その後で本流に着手するということが述べられている。

（久保田）

セミナーは大変な盛会で、国連アーサー・ゴールドシュミット氏が座長となり沿岸国4ケ国、協力26ケ国国連機関、FAO, 世銀、アジア開銀、著名コンサルタントその他各国、各機関から多数が出席した。11月10日からの部会では私は（b）部門に出席した。また、日本側から提出されたコメント（Comments on the Draft of Amplified Basin Plan — 付録③）も歓迎されたようである。

話題になったプロジェクトとしては、ソンバ計画、スレポク支流計画、スタントレン本流計画、ナムテン支流計画、デルタ開発計画などがあるが、アジア開銀との討議においては天水利用による耕作を考えなければならないということであった。

ミトワン橋梁計画は現在中断されており、ヴィエトナム側もその推進方を日本に頼むということを言っていた。この橋のクリアランス（25mの予定を45mにする）の関係もあって、カンボディアにとっては海上からの交通はコンポンソム港（旧名シハヌークビル港）で十分ではないかという問題もあるが、今後日本も協力すべきではないだろうか。

スタントレン計画は電力と洪水調節のメリットは考えられるが巨大な計画でもありその具体化は大部先のことゝ思われる。ただ、日本として航空写真とか地質調査などにタッチしておいて将来のチャンスを失うことにならないようにするべきと思う。

（井上）

インド支那半島が現在あのような状態にもかゝわらず、このセミナーでは熱心な討論が行なわれたということは極めて興味がある。

（市浦）

このBasin Plan Reportはどのように finalizeつまり来年のECAFE総会で採択されるのであろうか？

（井上）

Basin Planの具体化する順序のことゝ思うが……。

（安芸）

この前の会議はセミナーであったのでそのfinalizationはメコン委員会（明年1月ラオス ヴィエンチャンで開催される予定）で行なわれ、明年春のECAFE総会でformalなものとなるであろう。

重複するが、デルタの問題、それに関連してスタントレン計画、また電力に関連してナムテン計画などがセミナーのポイントとなったようだ。

（井上）

次期メコン委員会の開催などを考慮して、日本としては今後このAmplified Basin Planの中でどの計画に協力するべきかを考えておく必要があるのではないか？

（久保田）

例えば　ナムテン計画（5カ年で調査費約300万ドル、）
　　アバースレポク計画（調査費年20～30万ドルとして2～3年）
　　スタントレン計画（調査費500～600万ドルとして5～6年）
などが考えられるが……。

（市浦）

スタントレンの航空写真による地図作成が緊急と思うが。

（久保田）

金を余り必要としないで来年からすぐ着手できるものとしては、デルタ開発調査（20～30万ドル）などが考えられる。

（井上）

私見として、スタントレンについては日本はある役割を果すべきであると思う。ただし、これをやるとすれば、パモンもサンボールもやらないという前提がある。アメリカがパモンをやっている最中であるのでこの了承がなければならない。また、この地域で3国協調という政治情勢がなければならず、現状の中で技術的問題のみを採り上げるということは慎重でなければならぬが、私としてはスタントレンは是非日本としてタッチするべきであると思う。

（渋沢）

日本が今後技術協力を行なうとするとヴィエトナムあたりがよいのではないか？

（久保田）

ヴィエトナムのスレポクよりもメコンデルタの方が効率的だと思う。

パモンを現在アメリカが調査を実施しているが、3年や5年では着手出来ないと思うのでスタントレンは余りセッカチにやる必要はないと思う。

来年、再来年あたりは予備調査程度で2、3年後に本格的に年100万ドルを使う予定で調査をやってみたらどうであろうか？

（井上）

同感である。デルタの問題について、リリエンソールとの関係はどうなっているのであろうか？

（安芸）

リリエンソールの考え方とヴィエトナム政府との考え方は一致していないように見受けられる。リリエンソールの考え方が余り大き過ぎるというのが問題のようだ。

デルタの再調査は是非考えるべきと思う。

（久保田）

デルタ開発はプロジェクトとして好適なものと思う。また、スタントレンに

関して、その踏査（Reconnaissance）を採り上げたらどうであろうか？

（市浦）

リリエンソールはデルタのヴィエトナム部分しかやっていないようだ。

（久保田）

バモン、スタントレンがあったとしても下流の洪水が３ｍも５ｍも下らないので、むしろ下流の高い部分に堤防を作ってPilot Farmとする案も考えられる。

（市浦）

スタントレンの件だが、そのReservoir 容量が明確に推定できないのでそのための航空写真をとって、その確認をするべきであると思う。

（井上・久保田）

同感。取り敢えず航空写真をとるということにして様子をみたらどうか。

（井上）

１０乃至１５年後になればサンボールか、スタントレンかということになるであろうが、遠い将来のことゝ諦らめないで、日本がaerial surveyを実施することで、スタントレンに接触しておくことが大事だと思う。

（安芸）

それと共に、デルタ問題をさらに追求するべきだと考える。

（井上）

メコン開発も今後新しい段階に入りつつあるが、日本としてどのような協力を行なうべきであろうか？

スタントレンは極めて大型のプロジェクトであるが、今すぐ大金を必要とするということでもないので、長期的視野に基ずいた計画を樹立して毎年少しずつでも調査費を計上してスタントレンとの接触を保ってゆくべきだと私は考え

る。

（久保田）

これまでの討議の結果をまとめて次回会議に持ちよってはどうか？

（井上）

日本政府としてアプローチし易い方策を事務局でまとめるということで本日の会議を終りたいと思う。皆様から有益な御意見を載き厚く感謝致します。

以　上

付　　録

1. メコン河拡大流域計画草案に関するセミナール参加報告
2. Report of the Seminar on the Draft Amplified Basin Plan Report
3. Comments on the Draft of Amplified Basin Plan

付 録 1

メコン河拡大流域計画草案に関するセミナール参加報告

安芸皎一
久保田豊
新家義雄
小田親

メコン委員会はかねてからの懸案であった「拡大流域計画」の草案を作成し、これを討議するためのセミナールをバンコクで開催した。

開催期間は11月9日から11月16日までの8日間であった。参加者は沿岸4か国を始めとし、協力26か国、国連専門機関、エカフェ、世界銀行、アジア開発銀行、フォード財団、事務局等の関係者を含め150名余に達し非常な盛会であった。

開会式は11月9日午前9時からエカフェ事務局会議室で行われ、引つゞいて構成、規約の討議が午前中行なわれた。

午後は会場をビエンタイホテルに移し、その後11月16日まで連日熱心な討議が続けられた。

討議の日程は次の通りであった。

11月 9日(月)	開会、構成、規約	(午前)
	全般討議	(午後)
11月10日(火)	部会(a)電力、かんがい、治水	
	〃 (b)社会、経済	
11月11日(水)	部会(a)農業、輸送	
	〃 (b)環境、法制、機構	
11月12日(木)	調査計画	(午前)
	〃	(午後)
11月13日(金)	全般討議	(午前)
	セミナール報告 草案作成	(午後)

11月14日（土）	セミナール報告	（午前）
	草案作成	（午後）
11月16日（月）	草案審議、採択	
	閉　会	（正午）

セミナールで討議された内容は別添(1)「拡大流域計画報告書に関するセミナールの報告」の通りで、その主な事項は下記の通りである。

(1) セミナールの構成
(2) 草案の性格
(3) 流域開発の必要性
(4) 水　資　源
(5) 農　　業
(6) 産　　業
(7) 移住、公衆衛生、労働その他社会開発
(8) 水面その他の交通
(9) 環境問題
(10) 法制、組織、機構
(11) 今後の調査計画

セミナールの司会は国連開発機構のアーサー・ゴールドシュミット氏が行なった。又、セミナールのコンサルタントとしてH.C. ボス教授、カンワールセイン氏およびギルバート・ホワイト教授が選ばれた。

セミナールの討議は総会と部会に分けて行なわれ、沿岸国代表が順番に座長をつとめた。討議全体を通じて沿岸4か国のうち、ヴィエトナム代表が最も活発に発言した。協力国では米国、日本、イスラエル、オランダの発言が、国連専門機関ではFAOの発言が注目された。世界銀行、アジア開発銀行の代表者がメコンの開発計画に関心を示し、積極的な発言を行なった。

日本側は別添(2)および(3)のコメントを提出し、説明を行なった。その主旨はセミナール報告書の中に採択された。

今回の草案は「拡大流域計画」と題しているが、その中味は副題の示す通り「メコン河下流域の水および関連資源の開発に当って、その骨格となる事業計

画」を提示したものであって、まだ「完全な流域計画」ではない。しかし、紀元2,000年迄の30年間に対し、一応の目標を設定したと言う意味で注目される。この中で特に支流調査、さらにデルタの開発に関連してスタントレン計画調査の促進が討議された。

今後わが国がメコン河開発に協力する場合の基本方針もこの目標に沿ったものであることが望ましい。

現在工事中のラオス、ナムグム計画、カンボジア、プレクトノット計画に対する資本協力の外、ベトナム国内の支流計画並びにデルタ地域計画の早期実現に協力することが望まれる。

調査事業に対する技術協力としては従来行なってきた支流計画即ちカンボジア太湖沿岸計画、ベトナムのスレボック計画等の調査を継続するほか、下記の調査をわが国の技術協力で行なうことが望まれる。

(1) スタントレン計画
(2) デルタ開発計画
(3) ナムテン計画
(4) 河床変動対策

以 上

UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL

LIMITED
E/CN. 11/WRD/MKG/L. 318
(Draft)
14 November 1970
ORIGINAL : ENGLISH

UNITED NATIONS

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST

Committee for Coordination of Investigations
of the Lower Mekong Basin (Khmer Republic,
Laos, Thailand and the Republic of Viet-Nam)

Seminar on the Draft Amplified Basin Plan Report
Monday 9 - Monday 16 November 1970
Bangkok, Thailand

D R A F T

REPORT OF THE SEMINAR ON THE DRAFT AMPLIFIED BASIN PLAN REPORT

Contents

ORGANIZATION OF THE SEMINAR

The purpose of the Seminar was to provide for a wide exchange of technical and expert views on the draft Amplified Basin Plan Report, among riparian technical and planning personnel, cooperating country and agency experts, and the Mekong Secretariat, towards the further improvement and revision of the draft Basin Plan report under the direction of the Mekong Committee.

The Seminar on the draft Basin Plan report was held at Bangkok, Thailand, from 9 to 16 November 1970. Mr. Arthur Goldschmidt served as Seminar Director; Professor H. C. Bos, Mr. Kanwar Sain and Professor Gilbert White, served as Seminar consultants, all of whom served as rapporteurs together with Mr. Roland Kampmeier and Mr. A. de Vajda. The participants in the Seminar are listed in Annex 1. The business of the Seminar was conducted in plenary and group meetings in accordance with the program reproduced in Annex 2, and with the guidelines proposed by the Director of the Seminar reproduced as Annex 3.

The plenary and group meetings of the Seminar were chaired in turn by the leaders of the riparian delegations. The statements made at the opening of the Seminar by Mr. U Nyun, Executive Secretary of ECAFE, by Mr. Hing Un, leader of the Khmer Republic delegation, by Mr. W.J. van der Oord, Acting Executive Agent of the Mekong Committee, and by Mr. Arthur Goldschmidt, Seminar Director, are reproduced as Annexes 4, 5, 6 and 7 respectively.

Seminar Documents

The Seminar had before it the draft Amplified Basin Plan report, as well as (i) the report of the deliberations on the draft Basin Plan report by the Mekong Committee at its 48th Session (October 1970) and by the Advisory Board of the Mekong Committee at its 14th Meeting (September-October 1970); and (ii) the reports of the working sessions held among the riparian national authorities of the Khmer Republic, Laos, Thailand and the Republic of Viet-Nam during 1970, as listed below.

- Report of working session on draft Amplified Basin Plan (1-6 August 1970, Phnom Penh, Cambodia)
- Report of working session on draft Amplified Basin Plan (20-24 July 1970, Vientiane, Laos)

- Report of working session on draft Amplified Basin Plan (16 March - 15 July 1970, Bangkok, Thailand)

- Report of working session on draft Amplified Basin Plan (10-17 August 1970, Saigon, Republic of Viet-Nam)

The Seminar participants were informed, at the outset of the Seminar, by the Seminar Director and the Acting Executive Agent of the Mekong Committee that the views expressed by the Mekong Committee at its 48th Session, by the Advisory Board at its 14th Meeting, and by the riparian authorities of the Khmer Republic, Laos, Thailand and the Republic of Viet-Nam in the working sessions, as recorded in the above-mentioned documents, would be fully taken into account in the revision of the draft Amplified Basin Plan report by the Mekong Secretariat, Further consultation and revision, as required, would in any event be conducted by the Mekong Secretariat in close collaboration with the national authorities of the four riparian countries.

The Seminar participants noted in particular that the Mekong Committee had, at its Forty-eighth Session, expressed the wish that the following sections of the draft Plan report would be considered as having been deleted: Chapter I, page 21 to the middle of page 23; Chapter V, pages 128 to 134; and the Annex to Chapter VI.

In addition to this report of the Seminar, statements and papers presented by participants were submitted on the occasion of the Seminar to the Secretariat for consideration in its further revision of the draft Report.

NATURE OF THE DRAFT BASIN PLAN REPORT

It is basically sound to undertake the development of the water resources of the Lower Mekong Basin as a comprehensive system in which each individual project is appraised in terms of its contribution to the welfare of the people of the countries of the basin. The Basin Plan enables the four riparian countries to judge how management of water flow at one place would be likely to affect flow elsewhere. Some of the judgements must be tentative until additional studies are completed, but a rough framework for appraisal of both physical and social effects is now available. Any appraisal under this systems approach will recognize that while the emphasis of the proposed development

measures is on power, irrigation and flood control, other significant activities will also deserve consideration, and that the estimates of human needs which the programmes are intended to serve are subject to wide variation according to assumptions as to public aims for agriculture, foreign trade and other national goals.

Scope

It is considered essential that current efforts be pursued to harmonize the Mekong Basin Plan with national economic and social plans for the riparian countries. This may not be easy, in view of the Mekong time horizon being 30 years in contrast to the 5-year national plans, and in view of the unprecedented problems of combining a co-operative international effort in the water sector with comprehensive national planning. However, if power needs and capability are studied for all parts of the four countries then agriculture may deserve similar treatment, and it should be possible, as time goes on, and mutual comprehension is established between national and Committee planners, to reconcile basic data, criteria and objectives.

The Seminar recognizes the need for Mekong planning which would permit the examination of alternative methods of meeting economic and social needs, going beyond the water development measures specified in the Committee's terms of reference. Thus, for example, the improvement of rainfed agriculture cannot be neglected in relation to irrigation development. Comparative studies of other means of developing the Basin's resources for the public welfare should therefore be stimulated, and their results brought to bear on the Mekong Basin Plan.

Timing

There is strong support for a schedule which would place highest priority on the improvement of methods to assure the full anticipated benefits from irrigation and associated aspects of agricultural development, as well as from power generation. This favors the present plans which envisage the initiation of tributary projects before large projects on the mainstream. It also requires early and vigorous action on projects in which there would be full opportunity to experiment with ways of organizing effectively the complementary measures needed to transform traditional rainfed into modern irrigated farming. The emphasis during the years immediately ahead should be on preserving flexibility of action.

Experimentation on a practical, and effective, scale should be

encouraged. As new projects and studies are completed there will be special need to appraise their experience and to apply the lessons promptly to subsequent action on a wider front.

Methodology

The methods of analysis used in the optimization of benefits among possible combinations of project variants in the Plan Report fall short of a complete or ultimate optimization, even confined to the water sector. This is inevitable at the present stage of the investigations and of available data. However, some Seminar participants would favor refinements in methodology to take account of the effects of alternative assumptions, such as in agricultural aims, in benefit-cost analysis, and to try other forms of analysis. The latter would include incremental analysis of projects and methods of allowing for effects in other sectors, and cover estimates of results such as income redistribution which are not normally included in national economic efficiency calculations.

Role of the Report

The role which the completed Basin Plan Report should have in Basin and regional planning is yet to be determined. At one extreme, there might be concern to refine and polish the document over a period of time in order to make it as nearly as practical a definitive outline or master plan of action over many years to come. Seen in that light, the revisions to be made would require extensive gathering of field data, further studies, changes and computations, and the document would probably be obsolete before it was published.

As the other extreme, many view the Report as a step in what should be a continuous and progressively complex process of adjusting aims and measures to new conditions and data. Some feel that, seen from that standpoint, the Report should be published as promptly as practicable, simply correcting any errors, noting the criticism and suggestions offered, and pointing the way to early practical demonstrations and urgent studies. The Report can be considered as a current version of an indicative plan which should be subject to revision from time to time.

In between, there are other possible roles for the Report. The Committee needs to define precisely the role it sees for the document, how much stress should be placed on its value as a source of information and inspiration, and the kinds of uses which should be encouraged.

THE NEEDS OF THE BASIN FOR DEVELOPMENT

The needs which the Mekong programme should help to meet can be formulated in broad general terms of the final objectives of the development policies of the Mekong riparian countries, such as increasing the per capita income, reduction of unemployment and underemployment, and equitable income distribution. The needs can also be expressed in terms of concrete and more immediate targets, such as figures for agricultural production, areas to be irrigated, and power to be produced. It should be realized that the last kind of targets do not always follow directly, simply and technically from the basic objectives but are dependent on a number of assumptions, including assumptions about the development policies of the countries concerned.

The evaluation and selection of individual water resource projects, and the sequences shown in the draft Report, are based on methods and criteria which take the estimated future power and irrigation requirements of the Lower Mekong Basin as given. These estimates, however, are based on a number of assumptions, some of which are of a technical nature, e.g. the effect of irrigation on agricultural yields, and on others which imply policy decisions. The food requirements of the Basin, for example, have been estimated under the assumption that each of the four regions in the Basin area will have to be self-sufficient in food and in addition will have to produce surpluses for exports. These are assumptions about policy which seem to require further analysis. The estimates of future demand for power may likewise be affected by policy decisions; for example the extensive electrification of rural areas may affect the demand for power.

For these reasons it would be helpful to include in the Report, as a beginning, examples of the effect of varying a few of the assumptions. These might show the needs for food production in the case that self-sufficiency were not an aim, or that the export market were to disappear or that production per hectare in the rainfed rice areas of the four countries were to be 10 per cent larger than assumed. Such a sensitivity analysis would help to show whether and to what extent the evaluation and selection of water resource projects depend on the assumed needs for power and irrigation.

It would, however, be desirable to assess the concrete present and and future needs of the Basin more thoroughly in the broader framework of the short and long term devel opment of the economies of each of the four Mekong riparian countries. These perspectives would require the projection of the main features of the overall development of the countries and their economic structure The broader geographical

scope of this framework would seem desirable because the development of the needs of those parts of Thailand and Viet-Nam which are situated in the Mekong Basin cannot be isolated from the development of the other parts of these countries. This approach would also necessitate the more precise and explicit specification of the assumptions made for estimating the needs of the Basin.

WATER RESOURCES

Quality of Data

More hydrological and meteorological data will be needed for project sites to be developed on the tributaries. Also of equal importance, a major programme of data collection will be required for agricultural projects. Here data are needed regarding suspended sediment load and bed load of the Mekong river and its tributaries, to facilitate studies regarding silting and erosion. The suitability and adequacy of stations should be reviewed periodically.

Much more information is required for the planning of Delta development in the Khmer Republic and the Republic of Viet-Nam. Some of the typical questions which have to be answered are: How much can agricultural production be increased by the improvement of drainage alone? How great an increase would result from salinity control measures alone? How great a reduction in flood levels at various points would give optimum conditions for agricultural production? Where should dykes be constructed in the interest of increasing production and without seriously affecting the hydraulic conditions? What is the effect of diverting Mekong water during high floods through by-passes? What would be the effect, at various critical points, of the judicious operation of Pa Mong, Stung Treng and Tonle Sap reservoirs in isolation and in combination with each other? As construction of the Stung Treng reservoir or other upstream storage may not be achieved earlier than 1,990 the flood control needs of the Delta during the next 20 years or so will probably have to be met progressively by the construction of dykes. Once dykes have been constructed to protect areas subject to flooding, the role of dams and reservoirs in flood control will have to be re-examined.

The gradually increasing volumes of water required for irrigation during each season have to be estimated as well as the flow of river water during the dry season to limit salt water intrusion. Pumping

of water from the river system may be a solution for the Delta in the initial years. If the Pa Mong project is not constructed until say 1985, the question would be whether pumping alone from the mainstream could meet the requirements in the Delta for the next 15 years or so, or whether it would be advisable to examine the desirability of constructing the Tonle Sap berrage to meet the needs of irrigation until the Pa Mong dam is completed. In view of this it will be necessary to complete, as soon as possible, investigations of the effects of the Tonle Sap barrage on fish production in the Great Lake and on crop production along the periphery of the lake as a result of changes in the water regime. To enable the Khmer Republic and the Republic of Viet-Nam to take an objective view regarding the usefulness of the Tonle Sap barrage, every effort should be made to meet the Mekong Committee's wish that these important questions be clarified in the near future. This will be of considerable help in planning for the development of the Delta as a whole.

Potential Projects

The Basin Plan Report identifies tributary projects only up to 1980. As tributary projects may have certain advantages, full consideration should be given to such projects even after 1980. It is to be noted that the potential of tributaries in Laos, according to recent desk studies made by the Secretariat, is 12 million kW against 5 million shown in the draft Report. The Nam Ngum tributary alone may have a potential of about 1.7 million kW by construction of four or five projects upstream of the site where a multipurpose dam with a potential of 135,000 kW is under construction at present. The possibility of meeing the power needs of the Basin, or even needs outside the Basin, from tributary projects in Laos and from tributaries in the other three countries, therefore needs to be considered. In Viet-Nam, the Upper Se San and Upper Sre Pok tributaries of the Mekong have a large potential. Some tributaries outside the Mekong Basin are also stated to have similar potential for large-scale power development; for example, in Viet-Nam the Song Ba tributary has a site at An-Khe, where a multipurpose project with a potential of 160 MW appears feasible. Undoubtedly, the merits and demerits of tributary projects as compared with mainstream projects should be carefully weighed as the results of further feasibility and pre-feasibility studies become available.

Major Mainstream Reservoir Projects

It is accepted that most of the immediate irrigation and power needs can be met from tributary projects until at least the end of the

present decade. However, Thailand will need additional power even before that time. The Pa Mong project offers one of the ways to provide power required in Thailand in the 1980s and beyond, and also to furnish irrigation water in the dry North-Eastern part of the country, to reduce flood damage in both Thailand and Laos, and to provide the water needed for the development of dry-season irrigation in the Delta.

As the Stung Treng project is one of the most important mainstream projects from the point of view of flood control and is also capable of generating a large block of hydro-power and of providing water for the development of dry-season irrigation in the vast deltaic areas in the Khmer Republic and the Republic of Viet-Nam, reconnaissance surveys (including resettlement studies) will have to be carried out for this project, as soon as conditions permit, as already envisaged by the Mekong Committee. In carrying out these investigations, the effect of flood storage in this reservoir in reducing the Great Lake level, as regards both fish and cultivation, must also be studied.

Flood Problems

The usefulness of the Lower Mekong mathematical models in flood forecasting in the Basin was noted; the activities already begun during the 1970 flood season certainly deserve to be continued. The Mekong Committee should explore whether the hydrological observations at Stung Treng and Kratie can be resumed, even before the cessation of hostilities in Cambodia.

It will be a long time before major flood control works can be completed. Even then, some flood plains will remain unprotected and large protected areas will be subject to inundation by rare flows of high magnitude which could have catastrophic effects on life and property. In these circumstances it is important that the Basin Plan Report make provision for development of a cooperative programme of flood loss management to complement the construction of protection works. This should be organized around the flood warning system and should include detailed plans for dissemination and emergency use of warnings, technical advice on flood proofing of structures, and ways of planning land use to minimize flood losses.

COMPLEMENTARY PROGRAMME : AGRICULTURE

The agricultural section of the draft Basin Report deals with measures to satisfy the growing needs of a fast-growing population and makes provision for increase of production for exports to earn foreign exchange.

The Seminar noted that the projections of future needs made in the draft Report are calculated as follows: the needs for Laos and the Khmer Republic include almost the entire country, as they are almost entirely situated in the Basin; for Thailand, the North-East alone is taken into calculation under the assumption that this part of the country should for social reasons become self-sufficient and earn foreign exchange through exports; for Viet-Nam the assumption is made that the Mekong Delta should provide 80 per cent of the country's food requirements and also provide for additional exports.

Consideration of the future needs of the riparian countries as a whole, and not limited to the Lower Mekong Basin alone, is generally felt to be more appropriate, although it is realized that such an approach may require different treatment for certain parts of the Basin in the draft Plan.

As regards the utilization and control of the water resources of the Mekong Basin for agricultural purposes, the importance is recognized of partial water control measures on the land, through better water retention and drainage, as well as the introduction of supplementary irrigation during the rainy season, which do not require expensive storage facilities.

Due consideration should be given to nutrition, forestry, watershed management, livestock, fisheries, rural education and training, and agricultural processing, storage and marketing, which should be included in the Mekong programme; it was felt that this could best be done by using area studies in selected sub-catchments and pioneer projects. A timely survey of forestry resources in areas to be flooded is fully justified by the size of these areas.

Agricultural Research

The view was expressed that the work of the national research stations should be strengthened, and that their work should be coordinated and the results correlated. Special emphasis should be given to the study of soilsand soil management, as well as soil-water-plant re-

lation ships

Pioneer Agricultural Projects

The Seminar agrees on the important role these projects can play in preparing the way for large irrigation development, and on the need to undertake similar projects to create new homes for displaced people in the riparian countries.

While experimental and research stations deal with basic investigations in the fields of agronomy, soil, crop and water relationship, and soil and water management, pilot projects deal essentially with trial demonstration on a practical scale, and pioneer agricultural projects are created to serve as models in the management and operation of agricultural production units. The farmers in these pioneer agricultural projects should be encouraged to try diversification of crops, as the spectacular increase of rice yields makes such diversification advisable. Diversification should be tested in the Delta area, as well as elsewhere, under the specific soil and water conditions.

In smaller projects or pilot areas, attention should be given to the intergration of the whole array of public measures - credit, seed, fertilizer, pesticides, roads, markets, taxes, technical services, education, health services, and the like - to accompany the water development. Equally important is the development of managerial skills with respect to operation, distribution and use of water. Revision and coordination of institutional, including administrative, arrangements will be involved. The optimum size of such ventures is subject to discussion and would in any case depend on the circumstances, but it should be large enough to give a valid sample of reality, to test methods of economic and social organization and to demonstrate the kind of change in living conditions which Mekong development would bring.

Some tributary projects might be treated as pioneer agricultural projects. Pioneer agricultural projects should be managed by governments, with the greatest possible and active participation of the farming community.

The Mekong Committee could play a very important role in the collection and processing of data obtained at the various agricultural pioneer and pilot projects and experimental farms, and in the dissemination of the results obtained by them. The Committee could also seek to initiate additional desirable research, demonstration and production projects.

The participation of outside agencies should be limited to:

1. help in planning, design, and feasibility studies;

2. help in operation of the projects during the initial stages (2 years);

3. financial assistance in the construction of projects and in providing equipment.

It would seem highly desirable that the aid-giving agencies should continue to remain associated with the projects by performing periodical evaluations of results and rendering some additional assistance if required. This might be for an additional period of three or four years.

Pioner agricultural projects should be considered as production units spearheading larger irrigation schemes and should be located accordingly.

The same considerations apply to efforts to settle people who are displaced by reservoir construction, war, and other causes. To care for these people will require large and comprehensive projects, some of which may be linked with Mekong irrigation. All of them call for special care in moving and mixing populations from different areas.

The need to establish pioneer agricultural projects in areas of dryfarming should not be overlooked. A large part of the Basin crop area will have to depend entirely on rain or, at the most, on improvements in the form of supplementary irrigation during the rainy season, even after completion of the full programme of Mekong development.

Participation of the private sector in pioneer agricultural projects would be desirable, for example in processing agricultural products. Other fields where the private sector could play a useful role are mechanization of cultivation, the supply of agricultural machinery as well as fertilizers, and the improvement of seeds by seed farms.

COMPLEMENTARY PROGRAMME: INDUSTRIES

A major purpose of the Basin Plan Report is to give a preliminary investment survey to provide a rough framework within which detailed

proposals can be drawn up for further studies. Industrial base studies should be given first priority. Side by side, industries that are likely to be stimulated by the Basin development programme in other fields, such as agricultural products, and by the generation of cheap power, should find a place in the future programme of surveys and studies.

Regarding further studies on the potential for electro-process industries, the material already available or envisaged in connection with aluminium, iron and steel, ferro-alloys, phosphoric acid and calcium carbide, etc., supplemented to a limited extent by market analysis, would give reasonable indications of the prospects for these new industries; any study in depth might perhaps be premature at present. Only when the firm costs of generation of hydro-power are known, at the implementation or definite project stage of some of the mainstream projects, will such detailed studies serve any useful purpose.

Some of the countries of the Basin will face a manpower surplus when peace is restored, and industrial development will help absorb this surplus. Unless the demobilized personnel, skilled, semi-skilled and unskilled, find immediate employment, problems of social disorder are bound to arise. Secondly, the Lower Mekong Basin countries, to a greater or lesser extent, suffer from trade deficits. Due attention should be given to the possibility of developing industries that are labour-intensive and utilize mostly indigenous materials. Such industries should also be export-oriented or oriented to the production of goods which are imported at present. The four Lower Mekong countries should continue to take measures to attract foreign capital and know-how for the promotion of such industries.

To increase their ability to compete in the world market, the four riparian countries should develop industries on a regional basis, so that the maximum advantage can be secured for the entire population of the four countries, by utilizing the most favourable conditions available for a particular industry in the four countries.

COMPLEMENTARY PROGRAMME : RESETTLEMENT, PUBLIC HEALTH, MANPOWER AND OTHER ELEMENTS OF SOCIAL DEVELOPMENT

General

The importance of the social aspects of the development of the

Lower Mekong Basin is generally recognized. The experience with some projects in this area, however, has shown that in the past sufficient attention has not always been given to these aspects. The Mekong Committee should profit as much as possible from examples of successful and unsuccessful social planning, both in the Mekong area and in other parts of the world. This experience, however, is limited and perhaps even non-existent for cases of multi-national projects such as the Mekong Project.

An important general problem concerns the question of the extent the Mekong Committee's Secretariat should itself engage in research for and planning of the social aspects of the development of the Basin Plan. This question has to be considered in a broader context. In order to avoid the danger of too broad a scope for its activities, it would seem desirable that the Mekong Committee continue to devote its activities to those aspects which are considered to be directly related to the development of the water resources of the Lower Mekong Basin. It should, however, also continue to encourage and assist, as it has done, research and other activities in the riparian countries which are considered to be of importance for the planning and implementation of Mekong projects.

Public Health

There exists a general consensus that public health provisions should be fully integrated in the planning and implementation of Mekong projects. The plan for each project should indicate a specific public health programme, for the preparation of which the cooperation of the national health authorities is essential; it also requires the representation of the respective Ministry of Public Health in the National Mekong Committee.

The development of public health facilities has also implications for manpower requirements, both in terms of medical and of paramedical personnel. The shortage of both kinds of personnel necessitates the organization of accelerated training programmes.

Two other problems in the field of public health require the highest priority. The first is the control of malaria, the most important health hazard in the Lower Mekong Basin, and the second, research on the transmission of schistosomiasis. Both problems are directly related to the development of the Basin and, therefore, deserve the attention they are receiving from the Mekong Committee. Other problems could be solved with the help of the national health authorities.

Resettlement

The Mekong Committee is concerned with problems of resettlement caused by flooding of reservoir lands. It is also concerned with the resettlement of people displaced by other causes, including war, on lands which irrigation projects will make available. The experience with resettlement schemes is very limited. Some of these experiences give grounds for caution against too detailed and rigid planning arrangements.

Successful resettlement of persons from the reservoir areas requires the provision of a number of complementary facilities, not only for agricultural production, but also in the social field: housing, roads, energy, public health facilities, etc. The complementarity of these different facilities may make desirable the setting up of a special inter-departmental governmental body for the coordination of these facilities.

Adequate attention should be given to the human aspects involved in displacing families from the reservoir areas and to a fair compensation for the material and human costs involved. In this regard, the Seminar notes that the Mekong Committee has already recommended a statement on principles and policies for resettlement and settlement in the Lower Mekong Basin, for consideration by the riparian Governments.

Employment and other social aspects

Reduction in the unemployment and undermployment of the labour force is an important objective of the development policies of the riparian countries. This objective will also have to be considered in the planning of the Lower Mekong Basin. Sufficient attention should therefore be given to the possibilities of using labour-intensive techniques, both in construction works, agriculture and the development of new manufacturing industries.

An assessment of the manpower requirements of the Plan will be necessary, but it is more important to assess these needs for the next 10 years than for a period of 30 years. The planning and implementation of educational programmes are in particular important for agricultural and extension workers. Rural training must be made functional. Also in the field of education it is desirable to explore the possibilities of regional cooperation.

Caution was expressed against large-scale pioneering social experiments because such experiments cannot yet be based on well-founded experience.

WATER AND OTHER TRANSPORTATION

It was recognized that the Mekong River should continue to play an important role in the transportation of goods and passengers in the various reaches of the river. These reaches should be improved by removing obstacles in the bed where required and by increasing channel depths in the low-water season. The use of the transport capability of the river, especially for carrying agricultural products, can be encouraged by construction of feeder roads. The desirability of providing a lock or other alternative means to handle the river traffic at every dam site proposed to be built along the main Mekong River should be carefully considered during the feasibility investigations. The decision to construct such structures should be guided by the economic studies, based on future foreseable traffic needs, but the possibility of constructing them, taking into account the established principle of freedom of navigation, should not be blocked.

The possible need for a deep sea-port should be studied to permit the establishment of heavy industries and the import of heavy raw materials, using modern large-size ships which require greater water depth than is available at present.

There is scope for the improvement of water transport craft, to carry greater tonnage on relatively shallow waterways with restricted overhead clearance.

The Seminar notes that the Asian Development Bank is carrying out a regional transport study for South-East Asia, including the countries of the Lower Mekong Basin, and that this report, which is to become available in June 1971, will give useful information on the integration of various modes of transport in the region.

ENVIRONMENTAL PROBLEMS

Immediate Problems

Immediate interest in environmental problems of the Basin centres on the means by which the damaging effects of project construction, such as by fish kills at coffer dams, can be averted or remedied. Although a number of these effects have been anticipated by technical studies, there is difficulty in getting information about them to the local

people and officials most directly concerned.

The Basin Plan Report should refer to some of these difficulties, and recommend the steps necessary to prevent them in future. Such steps would include extension of the development support information service in project areas so that the people whose daily livelihood is disturbed will be aware of the possible disruptions, consulted as to proposed work, and helped to take remedial measures well in advance. Otherwise, hurried salvage operations will be required and local hostility generated.

Long-term Environmental Impacts

Any resource development involves manipulation of the environment leading to impacts on water, soil, animal life, and vegetation that may be far-reaching. These, in turn, interact with the local culture and economy. Sometimes these possible impacts are not studied in project planning, but even when they are the subject of special investigation, as with the fish movements in the Grand Lac, they may be so complex and so poorly understood that it is extremely difficult to predict them with confidence. Thus, any decision to go ahead with a construction project requires an estimate of what the likely environmental impacts may be, how serious they may be, and whether further studies or changes in project design are required before initiating work. It must also always take into account the possibility of unforeseen consequences.

The Mekong Committee has shown its awareness of environmental problems in the past by acting to minimize negative effects, particularly with regard to fisheries. In some of those cases positive gains have been realized. Its initial studies of watershed management, groundwater conditions, and human influence on hydrological phenomena are in the right direction. Many of the potential benefits of water quantity management cannot be realized unless the water is maintained in good quality. This requires attention to wastes from farm, industry and city. Neither agricultural nor fishery crops will prosper in unduly polluted waters, and even if they grow they may be the means of passing on substances poisonous to man. No doubt, as additional urgent questions about environmental impacts are identified there will be investigations directed at practical solutions. However, the possible severity of the problems warrants two types of action to which the report should refer.

1. Future findings on project feasibility should be prepared so as to contain explicit discussion of what is known and - more important - what is not known about the project's probable consequences for the

Basin environment. These are no well established methods for making such findings of feasibility, but it should be practicable for the Committee to put together a get of tentative guidelines for the studies and findings required. Statements on these topics should be a routine part of feasibility reports. It should be remembered that they cannot be fully effective unless basic studies of environmental relationships are initiated at the same time as engineering and economic investigations.

2. The Committee, as a part of its future planning, should organize more general investigations of the ecological systems in the Basin. These should look into the effects of the whole range of changes in land use, farming technology, water flow, water quality, and waste management. These more comprehensive investigations of ecological relationships might be focussed at first on one tributary area in each country. The Committee's contribution would be to provide an experienced and wise person to stimulate and advise on such activities. An important service would be to bring together in small groups the government officials, academic research workers and foreign research workers who have competence in the diverse problems.

A Summary Section

Even though the report now makes reference to environmental questions in a number of places, it would be desirable to summarize these in a separete section dealing with likely impacts and putting forward the two recommendations noted above. The topic deserves that emphasis.

LEGAL AND INSTITUTIONAL FRAMEWORK

There are two ways of approaching the Basin Plan Report as it affects the joint policy which the riparian countries may evolve in developing the waters of the Lower Mekong. One is a technical appraisal of the Plan's effectiveness in outlining the conditions in which the water system may be managed for optimal social and economic returns. The other is an administrative and legal appraisal of the means of evaluating and carrying out the desirable work.

In considering the administrative and legal problems, the Seminar is in agreement on a number of factors bearing on the choice of new arrangements for dealing with the Mekong, but it would be impor-

tant for the Report at two points to define and elaborate the crucial issue that requires eventual resolution by the four countries. This is the issue of when and how the existing Mekong Committee structure and authority should be modified or supplemented in order to achieve the anticipated development of water and related resources.

General Considerations

The Report shows that it is in the direct interest of the riparian countries to cooperate in further Mekong planning and construction while maintaining national sovereignty.

A reasonable working rule to follow in each sector of Basin development is for the countries to carry out such work on a national basis, closely coordinating their activities except when it is evident that they stand to gain from joint efforts. In this connexion, it is important that the riparian countries be assisted in harmonizing, as far as practicable, their national legislation and practice concerning natural resources.

The design of new legal arrangements should recognize that the particular form adopted, such as an enlarged authority or a new organization, proceeds most usefully from agreement on the functions to be performed. It would be premature to enter into a detailed discussion of institutional changes beyond a statement of principles until the broad outlines of the Plan are well understood and widely approved.

In detailed drafting, the changes should be seen as comprising administrative as well as legal modifications. Drafting of new terms of reference for the Committee goes hand in hand with reorgniazation of the Committee, expansion of personnel, and revised procedures for consultation and action.

The opportunities and challenge faced by the Mekong Committee are unique. While some lessons may be drawn from Western Europe and other international basins, the character of development - including both consumptive and non-consumptive water uses = and the sequence of studies are unprecedented and may require an original type of legal instrument.

Major classes of possible organizational change include (i) strengthening the mechanism for coordinating national action, (ii) formation of a new inter-governmental body with specified powers, and (iii) creation of an agency, having membership from the four riparian countries as well as some others, with authority to take certain inde-

pendent actions such as project financing or operation.

Timing

The Seminar recognizes that there is merit in proceeding cautiously and in not trying to make drastic changes until they are essential to gaining improvements in Basin welfare. The steps proposed in the Report for study along the lines recommended by the 1969 Legal Seminar are desirable, but more explicit attention should be given to the troublesome problem of deciding which changes are to be made at what time.

Some participants argue that there is no occasion to work on a "charter" or a plan of reorganization until the riparian countires agree to the systems approach and are fully aware of its implications for project evaluation and execution. A commitment to such a joint policy, they say, should precede detailed drafting.

Other participants are reluctant to see country adherence to a system development policy without a more precise description of the kind of organization and operating procedures to carry it out. Until they can envisage how a new Mekong agency would handle its work and how this would affect their own activities, they would defer approval of a further declaration of principles for action.

It may be possible to settle one of these questions before the other, but the countries may be more likely to resolve the problem by progressively examining and revising both substantive programmes and legal and institutional devices. Instead of a single, final formulation of joint policy, there may well be a series of partial adjustments as demanded by new projects.

Additions to the draft Basin Plan Report

It is probable that the Mekong Committee's deliberations would be strengthened by making additions to the Report at two places.

1. A statement should be included to the effect that in acting on many parts of the Basin Plan the riparian countries are obliged to take a stand on how soon they are ready to set up some new or enlarged agency to execute international projects in their common interest. This will involve a specific position with regard to their willingness to pursue the development of the water resources of the Basin on an integrated basis (systems approach). The point needs to be made explicitly.

2. The Report should either provide the reader with a rough assessment of the advantages and disadvantages which each country would be likely to experience if each of the several possible changes in organizational forms were to be adopted at a specified time, or should suggest a way of producing such an analysis in the near future. Assessment should cover social and political consequences as well as the usual estimates of legal feasibility, administrative efficiency, and probable economic returns and costs. This should help speed up the necessary decisions as to legal and institutional forms.

PROGRAMME OF FUTURE INVESTIGATIONS

Discussion of Chapter VI, "Programme of Future Investigations" led to suggestions for additions and changes along the lines described below, and clarified for the participants some changes in the Chapter which are already under way.

Central planning abd basinwide studies

It is felt that the various activities described in the programme of future investigations and considered below need better definition of the inter-relationships of timing and responsibility. Judicious use of network analysis methods, as planned, might be helpful in this process.

Another suggestion was that attention needs to be given to the special problems of sub-basins (e.g. in North-East Thailand, and the Tonle Sap basin).

Further studies on the Basin scale may well include a comprehensive review of the adequacy of all basic data required for economic analysis. The ecological consequences of large projects require considerable study. The effects of flow modifications on channel cross-section and silt movement also deserve attention.

Mainstream projects

A number of the participants feel that reconnaissance studies of mainstream projects should initially be limited to fewer projects than those listed in the programme. In addition to Delta development, the draft Report does give priority to two, namely Stung Treng and Nam

Theun, over Luang Prabang and Ban Koum. There was general agreement that the reconnaissance studies for the one or two selected projects should proceed as soon as security conditions permit and funds are available. For Luang Prabang and Ban Koum it would be desirable, when practicable, and at minimum expense, to collect some preliminary data to help test the validity of present judgements as to an Indicative Basin Plan. One suggestion is that sums saved by deferring more detailed studies for Luang Prabang and Ban Koum should be added to the proposed expenditures at Stung Treng and Nam Theun; others feel that these projects do not justify more than minimum outlays until the investigations show whether the projects are more attractive, or less so, than desk studies have indicated. For example, in the case of Stung Treng an exploration of the resettlement problem -- which should be one of the first aspects examined - might create serious doubts as to the viability of the project.

Tributary Projects

In the present draft, Chapter VI is almost silent regarding tributary projects. There is widespread sentiment among the participants that this needs to be changed.

In the first place, since the emphasis on project construction during the 1970s is on tributary rather than mainstream projects, it is felt that there should also be reasonably heavy emphasis in the proposed investigations on tributary development (with due regard, however, for the much greater volume of Mekong Secretariat work, and for the longer lead-time required for a large mainstream project.)

Secondly, it is felt that the Mekong Committee and its Secretariat should undertake to help the countries to see that all important preparatory studies are made for their respective national projects on the tributaries of the Mekong (and some would say also to some extent in the case of projects outside the Basin). Among various examples of preparatory work on which the Secretariat's advice and assistance could be important are rain and river gauging, cadastral surveys and soil surveys.

The Mekong Committee can also continue to help to link the needs for tributary investigations to possible sources of financial support.

In that connection some feel that there is little competition between funds available for major studies and those available for less expensive investigations.

Collaboration with the Four Basin Countries

Recurring frequently throughout the Seminar was the question of how best to harmonize Mekong investigations and development with the planning and development of the four countries, individually and as a group, so as to maximize the value of the Mekong programme for the people of the region by enhancing their economic and social development. It was repeatedly suggested or implied that steps towards that objective should be prominent in the future programme of investigations.

Close collaboration is urged between the Mekong Committee, its Secretariat, and the four governments, in the process of identifying and selecting projects for regional investigation which are of interest and value to them all and most clearly deserve implementation.

Another subject which came up repeatedly was the need for pioneer projects; it is important to provide for adequate attention to them in the programme of investigations. One suggestion is that in addition to the proposed pioneer projects, the Mekong Committee should explore the desirability of using similar approaches in other fields, such as fisheries, rural electrification and the processing of agricultural products.

The Seminar was pleased to learn that the revision of Chapter VI will include attention to supplementary investigations in the social and economic fields. There are wide variations, however, in the views as to how far-ranging the subjects should be to which the Mekong Committee and its Secretariat should give priority in the assignment of its limited manpower and financial resources, realizing that the major responsibility for these main subjects may rest with the Governments themselves or other agencies. In this connection, one specific suggestion is that the final sentences of the Chapter, regarding the Committee's role, should be re-examined and restated.

There are opposing views as to whether Chapter VI should be focussed exclusively on the investigations to be undertaken by the Mekong Committee or whether it should describe the broader tasks facing the four countries in all aspects related in various direct or indirect ways to development of the Mekong. The most promising middle ground appears to be to shape the chapter as a specific statement of the work which the Mekong Committee plans to undertake, accompanied by a description of other areas of high priority for national planning in which the Mekong Secretariat might most usefully be of assistance.

Organization and financing

Studies of future organization, financing and sharing of costs and benefits should have very high priority in the programme of future investigations, but the desired nature of such studies is less clear. There is considerable agreement that these studies call for a broad-based approach and one specific suggestion is that a group of 3-5 experts representing several disciplines might be assembled to confer with the Secretariat for a month or two on the economic and financing studies. A similar approach might be effective for studies of alternative future institutional arrangements. In both organizational question and the consideration of financing and sharing costs and benefits, the need is to identify alternative approaches, to appraise their respective advantages and disadvantages, and to suggest next steps for consideration by the Mekong Committee and the governments.

付 録 3

Comments on the Draft of Amplified Basin Plan

I. General

II. Agriculture (a) & (b)

III. Power

IV. Erosion & Sedimentation

V. Fishery

October 1970

OVERSEAS TECHNICAL COOPERATION AGENCY

I. General

1. This Report on the Amplified Basin Plan is valued highly as the first of its kind in which the projection of the overall picture of the future development of the Lower Mekong Basin is presented in a concise and concrete form. It contains assumptions of future national and regional needs, objectives of the economic and social development, and sequence of planning various projects.

2. Although the Amplified Basin Plan indicates the implementation program for a period of 30 years hereafter, it is regrettable that the data on which each of the projects is founded lack unification, some being too precise and some too rough. For this reason, the revision of the plan at an interval of five years could be judged as realistic and practical.

3. In the long range plan, eight projects on the mainstream including the delta have been instituted. The scale of the final stage of the seven power projects (including Sayabouri and Upper Thakek) of the above eight projects is discussed. As these seven projects will not be sufficient to meet the demand in the year 2,000, the Nam Theun No.2 project and the delta development are included in the plan instead of Sayabouri and Upper Thakek, instituting a combination of 12,400 MW of firm power, 22,000 MW of dependable peaking power, and irrigation of 5,800,000 hectares. In the plan, sequence D has been taken up as the ultimate alternative after obtaining the B/C ratio and IRR for sequence A to G. However, the difference of the B/C ratio and IRR among the projects is very slight, and it would be possible that the sequence may be reversed depending on the substance of such difference. Case study of sequence to decide the priority order of the projects may require a re-study.

4. When considering the development of the delta (Cambodia and Vietnam) which contains about 30% of the population of the entire basin area, the Stung Treng project should be given top priority. Again, the ten minor projects in Viet Nam which are almost comparable to

the Sambor Project have not been fully studied (Da Nhim, Da Quayon, Trian, Se San, An Khe are good, but La Nga is considered as not so good project.).

5. The cost of US$3,000,000,000 is estimated for the complementary development for the said period concerning agriculture, industry, transportation, water supply, social programme, etc., but the substance of the complimentary development is too abstract. It would be necessary to envisage their respective development in connection with the development of the water resources of the basin.

II. Agriculture (a)

In the agricultural plan of the Amplified Basin Plan, it is stated that increased production of agricultural products to meet the projected future demand can be materialized by controlling and utilizing the huge water resources of the Mekong.

As regards the estimation of the future demand for agricultural products, it is comparatively easy to forecast the amount of foodstuffs needed for consumption in the basin area by using such factors as the rates of population growth and the rates of increase in income. However, estimation of future demands for agricultural crops as raw materials for the processing industry and the export crops is accompanied by such complicated factors as the forecasts of the scale and the tempo of industrialization in the basin area and the future trend of overseas markets. The forecast made in the Report concerning the future consumption is acceptable as it is, but the forecast on the future production when examined carefully gives rise to the following questions.

The following assumptions have been made in the Report as the process of the forecast of the future agricultural production.

(1) The case in which the acreage of farmland is increased on the present expanding land base with conventional agricultural techniques.
(2) The case in which improved farming techniques are in-

troduced on the same acreage of farmland mentioned above and the yield per acre is increased.

(3) The case in which increased production per acre (including increase in the acreage of paddy field to two crops a year) is materialized through enforcement of flood control, irrigation and drainage using water of the mainstream and tributaries.

Anybody with some knowledge of agriculture in the Mekong basin area will notice that the logic is a step from (2) to (3). In other words, the estimation of the acreage of farmland which can be expanded without flood control, irrigation and drainage, and of increased production in case improved farming techniques are introduced to farmland thus expanded is left out between (2) and (3).

It goes without saying that the main factors of increased agricultural production are the increase in the acreage of farmland and the increased yield per acre. In the abovementioned process, the future increased production is estimated in the case of (3) on the basis of the improvement of farming techniques, provision of irrigation facilities, government and farmers' efforts and similar artificial factors, while in the cases of (1) and (2), estimation is made simply on the basis of expected future trend without taking into consideration such factors as construction of roads, land reclamation and immigration of farmers.

Agriculture in the lower Mekong basin has been developed in the form of expansion of the acreage of cultivated land, particularly of paddy field. In this area, all farmlands where rice can be grown under the present natural conditions are being used for rice cultivation, and it would be impossible to increase the acreage of paddy field without the installation of irrigation facilities. However, there still is much room left for increasing the acreage of farmland for cultivating rainfed crops. In the flood plains (Mekong delta) where one crop of rice is grown a year, the present rate of cultivated area is 43.5% while it is 15% in the plateaux with more upland fields. The total area comprises 6,900,000 hectares of flood plain

and 41,600,000 hectares of plateaux. This clearly shows that there is much room left for developing more upland fields.

The plateaux have not been developed hitherto because of the soil nature and natural conditions, but such would be more attributable to the poor means of communication, sparse population and such similar social causes. In policies for the development of the plateaux enforced hitherto, emphasis had been placed on the promotion of rice cultivation such as the use of water of the tributaries of the Mekong and the construction of storage ponds. The development of upland field had practically been disregarded. In spite of such circumstances, the increased production of maize, kenaf, cotton, etc. accomplished in the past decade or so in the northeastern district of Thailand (Korat Plateaux) is noteworthy. Cultivation of export crops, crops for domestic processing industries, cattle raising, and sericulture could be considered as good means of promoting development of upland fields.

Though the Report touches on the problems of increased production of crops other than rice and diversification of agriculture to some extent, the backbone of the plan is the increased production of rice through irrigated farming.

As the title of the Report shows, the Report is about the development of water and related resources, and it could be said that the development of upland fields does not come into the scope of such development. If so, the necessity of irrigation projects cannot be proved by the gap between the estimated demand and production of the entire lower Mekong basin, and such an attempt to use this process in estimating the future production has created a vacuum in the logical process of development.

Assuming that the agricultural development of the entire basin is to be considered free from the viewpoint of utilization of water resources, a feasibility study should be made on the possibility of development of upland fields and on projects for road construction, land reclamation and immigration of farmers as means of materializa-

tion of such possibility, and the result of such feasibility study should be compared with the feasibility of increased production derivable from irrigation, and thereupon an overall agricultural development plan should be planned. As there are many data available on the feasibility of irrigation and drainage projects, more study should be made hereafter on the development of upland fields.

Agriculture (b)

1. Development of water resources and introduction of new farming techniques are indispensable for enlargement of agricultural production. Since farmers are the people who are directly engaged in agricultural production, it is necessary to improve various social conditions such as for the ownership of land, credit and circulation system in order to encourage them to enlarge agricultural production and adapt themselves to new environment and technological renovation. This has been pointed out several times in the Report. However, as the improvement of social conditions is for the purpose of making possible the construction of irrigation facilities, it would be necessary to appeal strongly to the riparian countries to seriously consider such improvement as a means of taking necessary action or measures for the materialization of the agricultural development.

2. The optimum condition of each individual project does not always mean that the whole integrated plan is most suitable. For example, development projects in the upstream area may change the conditions for irrigation in the downstream area, and it could also be anticipated that the conditions may even become worse than before. Again, agriculture is most adversely affected by such an influence. Therefore, studies must be made to promote well balanced agricultural development. For this purpose, an ecological approach may become necessary.

3. Importation of improved techniques is absolutely necessary for agricultural development. When importing such new techniques (for

example, the use of fertilizers and agricultural chemical, and etc.), ideal techniques should not be imported all at once but gradually. As regards the use of agricultural chemicals, it is desirable to exercise prudence from the viewpoint of keeping the balance of the natural world.

4. It has been pointed out that water control is necessary, but it depends on to what extent such water control is going to be enforced. If water control is too strict, irrigation and drainage facilities of close texture will become necessary, and such would be costly. Again, it would be difficult to make the farmers in the basin to respond to such a strict water control.

5. It has been stated in the Report that it is necessary to increase the irrigated area to about 2,000,000 to 3,000,000 hectares within a period of thirty years from 1970 to 2000. However, many difficult problems are involved in relation to the enforcement of an irrigation plan for such a large area, and it would not be easy. 2,000,000 and 3,000,000 hectares are merely the figures indicated in the Amplified Basin Plan to show the necessity of irrigation, and it would be necessary to study various concrete problems when implementing each individual project.

III. Power

1. As the Basin Plan has been made with laying much emphasis on the revenue from power projects (originally, estimation should be made with emphasis placed equally on each purpose of the project such as power generation, irrigation, flood control, and etc.), it seems that power aspects have already been studied comprehensively and rather intensively.

2. Short-range plan should naturally be directed toward rural electrification at this stage, and it would be necessary to associate it with the complementary programme as planning cottage industry and distribution of power to such industry.

3. Concerning Viet Nam, the existing data on the promising projects other than those of the Mekong Basin have been studied. A total of ten

projects have been chosen, starting with power projects requiring lowest construction cost such as the entire system of Da Nhim and the Upper Se San under a short-range plan, and those projects requiring comparatively less construction cost under a long-range plan. As a preliminary calculation made on the proposed Song Ba project (Binh Dinh Province, Central Vietnam) shows that it would be able to generate electric power at a cost as low as 4 mills/kWh, it seems that this project should be reconsidered when making a final decision concerning the selection of the ten projects.

4. About the short-range plan.

On Table V-10a (Page V-91) of the Report, the projected area requirement is mentioned as 2.376 MW. Should not this be 237.6 MW?
Table V-11a (Page V-95)
Da Nhim No.1 600 MW should be corrected to Da Nhim No.1, 160 MW.

IV. Erosion and Sedimentation

What has been particularly noticeable in the recent ten years concerning the Mekong has been the changes in the river regime. Recently, an increase of cases of collapse of river banks has been reported, and the poor drainage in the delta area is posing serious problems. A suggestion was made concerning an investigation of sediment load.

The change in the river regime exerts much influence over the development of the delta. As pointed out in UNESCO's Hydrological Ten-Year Programme, it is necessary to study the physical change of the river from a more dynamic standpoint when formulating a development plan. The following matters are particularly interesting.

(1) Changes in the riverbed on the diverging point of Tonle Sap and Bassac rivers.
(2) Changes in the discharge regulating capacity of the Great Lake.
(3) Increasing sedimentation at the estuary of the Mekong.

V. Fishery

1. In the paragraph (III-43) on fish resources, the annual catch of the Cambodian Great Lake is given as 40 to 50 kg/ha. It would be necessary to make investigations to check if the above figures are correct.

2. In the paragraph (VI-78) on fishery, it is stated that the causes of the decrease in the catch of the Cambodian Great Lake will be investigated in two years, but it would be necessary to carry on the investigation for a much longer period.

3. It would be necessary to check into the movement of fish, and make investigations for starting fish breeding using reservoir.