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MANAGING ENERGY AND  
RESOURCE EFFICIENT CITIES:  
MINI-EVALUATION REPORT

Suchitra Punyaratabandhu-Bhakdi

THAILAND

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## MEREC REPORT

### EXECUTIVE SUMMARY

The MEREC Project in Phuket is directed at laying a foundation for more efficient energy and resource management by the Municipality working in close cooperation with other provincial and central government agencies and with the private sector. MEREC entails identification of a locality's resources and problems related to those resources. Insofar as possible, interrelationships between various sectors are specified. Strategies and project activities are then selected to make the most efficient use of the resources.

The MEREC concept constitutes a departure from conventional approaches to planning that begin with problem identification, setting priorities, and selecting from among alternative courses of action. It is conceivable that the MEREC approach could come into conflict with established planning procedures. In the Phuket case, however, because the Project grant is very small relative to the total municipal budget--about three per cent--the potential for conflict has been minimized.

The Project is the first foreign technical assistance grant that the Municipality has ever received. This has forced the Municipality to depart from its standard operating procedure in many instances, and has led to dependency relationships with a number of external institutional actors with whom the Municipality has not previously had close ties, namely, PSU, ORCD/DOLA, USAID, TVA, and the Changwad.

Coordinative mechanisms take time to establish, and smooth functioning becomes a trial and error process. The MEREC Project has had its problems, naturally, but no more than most ad hoc projects of this

(ii)

kind. If MEREC is to be extended to other localities in Thailand, however, close attention should be paid to the Phuket experience in order not to repeat mistakes and to replicate only what seems to work. Organization design is extremely important, but it is one aspect that is often overlooked in technical assistance projects.

The Municipality has expended a level of effort and energy on the Project that is quite disproportionate to the size of the Project grant. If the results of this endeavor are rather less than one would have expected, it is due more to internal administrative deficiencies and to overloads on staff time, than to a lack of zeal. Nevertheless, unless the Project begins to show tangible results, there is the danger of disenchantment setting in.

FINDINGS

- Because of the ad hoc character of the MEREC project organization, the Mayor is the key decisionmaker in the MEREC Project, which owes much of its impetus to his initiative. However, functional relationships with external agencies have created dependencies, especially with respect to funding and to technical assistance. This means that the institutional actors on whom the Municipality is dependent can effectively constrain and sometimes dictate choices.
- Insufficient attention has been paid to internal project administration. This has caused unnecessary delays and could adversely affect implementation of the subprojects.
- The MEREC Project is under the supervision of ORCD. Relationships between the Municipality and ORCD, and between ORCD and the USAID Project Officer are strained.
- The PSU consultant team has made a significant contribution to the MEREC Project and is favorably regarded by municipal officials and working groups. Some problems have arisen in regard to coordination, however.
- The current Municipal Development Plan identifies development problems and lists priorities. Energy and resource management is not mentioned. Seven of the twelve MEREC subprojects are included, however, in the current Plan, although they are not high on the Municipality's list of priorities. The MEREC approach is a departure from, and could conceivably conflict with, conventional planning approaches.

(iv)

- Some of the MEREC subprojects (e.g. mine reclamation and one of the low cost housing units) are sited outside city limits. This has attracted comment from some citizens that the Municipality might be better off attending to more pressing problems within the city itself.
- MEREC and DDMP constitute quite different approaches to fostering local management capabilities. DDMP can be characterized as, "Watch to see what works," whereas MEREC is "Learning by doing." Although the MEREC project organization could be improved, it still compares very favorably to DDMP's project organization. The Phuket Municipality is inexperienced in dealing with technical assistance grants and in creating the coordinative mechanisms and internal management procedures necessary for the sustainability of the MEREC Project. Yet the MEREC subprojects themselves do not actually call for management capabilities over and above what the Municipality already possesses.
- The Phuket Municipality is conscious of the fact that it has been singled out as a MEREC demonstration city. It has a stake in making MEREC a success, especially if it is to be a showcase for the rest of Thailand.
- Initial enthusiasm for the Project has decreased somewhat, owing to internal and external management difficulties. Also, municipal officials have a full-time work load: MEREC is in this sense an "extracurricular" task for them. Nevertheless, several factors operate in favor of the Project:
  - . Most of the subprojects can be executed independently of the rest, thus assuring that implementation failure in one subproject will not adversely affect the chances of success of the rest.

(v)

- . Some of the subprojects can be implemented without relying on external assistance. The less the dependency on other institutional actors, the greater the likelihood of success, because decisionmaking is rendered less complex and uncertainty is reduced.
  
- . Most of the subprojects are relatively small, and therefore feasible. In trying out new approaches such as MEREC, it is vital that tangible evidence of success be produced.
  
- Magnitude of funding levels is probably inadequate given the Project scope and purpose.

## I. BACKGROUND

The Managing Energy and Resource Efficient Cities Project (MERECE) was initiated on December 1, 1983, with the signing of a grant project agreement by the Agency for International Development, the Department of Local Administration, Royal Thai Government, and the Municipality of Phuket. The AID grant is in the amount of \$250,000 <sup>1/</sup>; the grantee's contribution to the project is estimated at \$60,700. The project assistance completion date is December 1, 1986.

The purposes of the MERECE project are: "(1) to lay a foundation for more efficient energy and resource management by small and medium-sized cities and (2) to demonstrate and promote greater municipal planning and implementation capacity." Intended as a demonstration project, world wide, MERECE has been implemented in three cities outside the U.S. to date: Tacloban in the Philippines; Guarda in Portugal; Phuket is the third MERECE city. In order to accomplish the project purposes, the Municipality of Phuket is to:

1. Engage in a structured planning process in which municipal officials will take the lead in identifying and prioritizing local energy and resource-based development problems; and
2. Implement the Action Plan derived from the above planning process, with assistance from the Office of Regional Cities Development (ORCD) and the Local Government Affairs Division of the Department of Local Administration (DOLA), the Tennessee Valley Authority (TVA), and consultants from the Prince of Songkhla University (PSU).

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<sup>1/</sup> In addition, U.S. Technical Assistance valued at approximately \$200,000 is provided to the project through a separate Participating Agency Service Agreement with the Tennessee Valley Authority (TVA).



1. A description of MEREC decisionmaking structures (formal and informal).
2. An analysis of the roles and interrelationships of organizations involved with MEREC activities.
3. A brief survey of organizations and individuals in Bangkok that could potentially or must (because of existing statutes) play a role in Phuket's municipal development.
4. A brief progress report on MEREC contractors funded by project funds. This report should relate to points 1 and 2 above.
5. A review of present city development plans in comparison with MEREC development plan.
6. A comparison of the DDMP project approach and MEREC strategies for fostering local management capabilities.
7. Identification of MEREC strategies which may be useful on a regional or national basis.

#### Methodology and Limitations

The findings of this report are based primarily on in-depth interviews of Phuket municipality officials and assemblymen, Phuket provincial officials, local community leaders, Prince of Songkhla University Consultants, representatives from ORCD, TVA and AID/Washington consultants, and the AID Project Officer. A total of 25 interviews were conducted. Songkhla interviews were held February 5-6; Phuket interviews February 6-8 and April 3-4; Bangkok interviews on January 11, February 11, March 21, April 8, and April 11. Details are reported in Annex A. Observations were also made of interactions in committee meetings between

municipal officials, PSU consultants, ORCD and DOLA representatives, TVA and AID/Washington consultants and the AID Project Officer during meetings held at the Phuket Municipality on April 3 and 4.

In addition, a review was made of relevant contracts and agreements, project documentation, work plans, and Phuket Municipality's Three-Year Plan.

In accordance with the terms of reference, a total of 20 man-days was expended on this study. The limitations inherent in "quickie" studies of this kind are quite obvious. Although I am reasonably confident about the general accuracy of the findings and impressions contained in this report, I feel compelled nevertheless to issue the usual cautionary note.

### III. DISCUSSION OF FINDINGS

The Scope of Work lists a series of topics to be addressed. The remainder of this report is organized accordingly, with each topic addressed in the order in which it appears in the Scope of Work. Because the first two topics are interrelated to such an extent, however, that it is virtually impossible to deal with one independently of the other, in the interest of clarity and brevity they have been combined into a single section.

#### A. Description of MEREC Decisionmaking Structures and Analysis of the Roles and Interrelationships of Organizations Involved with MEREC Activities

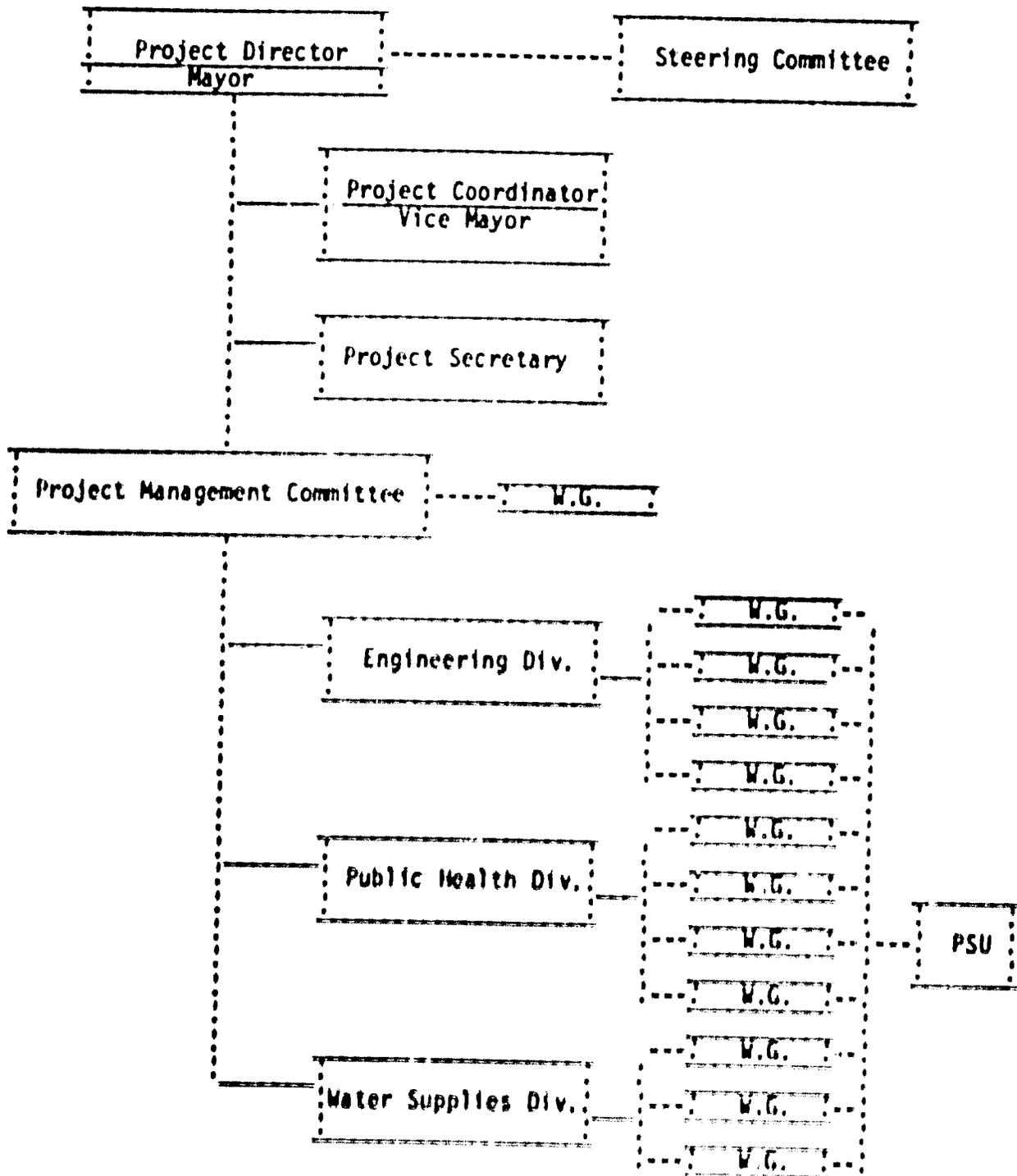
Formally, the MEREC project is lodged within the Municipality of Phuket. According to the Project Agreement, the "Project Manager will be the Mayor who will designate one of his deputies or a senior municipal official as Project Coordinator for day to day activities." Responsibility for the Project rests primarily with the Project Manager, although administrative duties required by the project are to be handled by the Project Coordinator.

The MEREC project organization chart is shown on the following page. The uppermost tier consists of a MEREC Steering Committee, chaired by the Mayor. Current membership consists of three municipal councilmen, the City Clerk ("Palad Tesaban"), and five municipal officials. The second tier consists of the Project Manager (again the Mayor), the Project Coordinator (Mr. Charoen Kiattikul, a Vice Mayor), and the Project Secretary (Ms. Rakngam Tongtan, a PC-Level 4 municipal official). The third tier consists of 11 working groups, one for each MEREC subproject. The working groups comprise between four to six members drawn from the Municipality and Changwad. There is overlapping membership among groups. For example the Municipality's Director of the Engineering Division is chair of five working groups; the Municipality's Director of the Public Health Division chairs five groups.

Technical support is provided to the MEREC project in the form of one advisor from TVA and a team of consultants from PSU (six engineering consultants, one economist, and one agriculturist). The TVA consultant meets with MEREC project staff approximately once every three months. PSU consultants meet more frequently, but there is no fixed time schedule. The USAID Project Officer generally attends Steering Committee meetings and accompanies the TVA consultant to Phuket and Songkhla.

Given the ad hoc nature of the MEREC project organization, it is only to be expected that the Mayor, both qua Mayor and as Chair of the Steering Committee and Project Manager, is cast in a critical decisionmaking role. This in fact has turned out to be the case. It is the Mayor who has the authority to schedule meetings, and as Chair during such meetings, he also has the final say. In fact, the MEREC Project owes its impetus chiefly to the initiative of the present Mayor, whose term of office expires in June 1985.

MEREC PROJECT ORGANIZATION  
PHUKET MUNICIPALITY



Note: The IVA Consultant meets with the Steering Committee, Project Manager, Project Coordinator, Project Secretary, and Working Groups approximately once every three months. PSU consultants meet with their counterparts more frequently, but do not have a fixed time schedule.

Day-to-day administration of the MEREC Project is supposedly the responsibility of the Project Coordinator, who is a Vice Mayor. Since the councilman has many other duties and interests, however, the burden has apparently fallen on the Project Secretary, a conscientious and energetic person three years out of college, who unfortunately has neither the requisite administrative background and experience nor is of sufficiently senior status to deal on a collegial basis with the working groups. Many of the Project's problems stem from insufficient attention to internal administration, which has quite likely stifled the momentum that should have developed as the Project got underway, and has led to undue reliance on the Mayor for direction.<sup>2/</sup> As matters stand, the future of the Project is heavily dependent on the Mayor's interest and initiative.

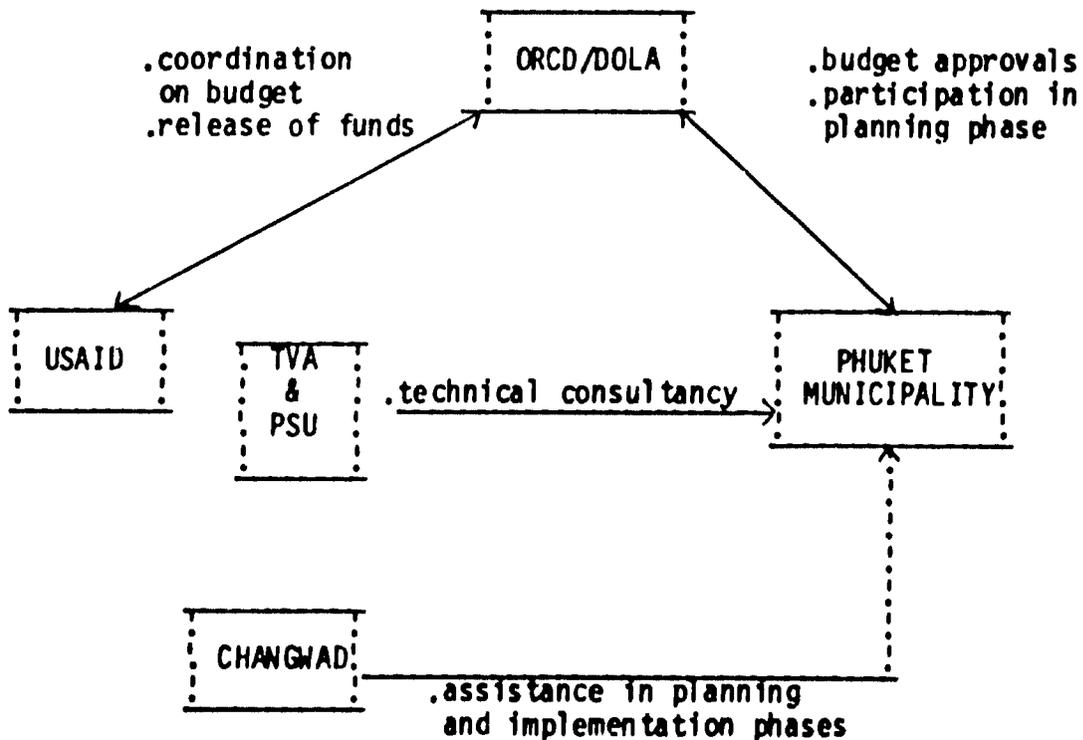
MEREC project activities are by and large a departure from routine municipal functions. Not only do the MEREC subprojects constitute "extra work" to be handled in addition to the regular workload, many also require technical competence in areas which are unfamiliar to municipal officials, simply because those areas (traffic regulation, for example) have generally been treated as outside municipal jurisdiction. Under these circumstances, there is little reason to expect the working groups to supply the initiative for the MEREC Project, unless they have the full support of the Mayor.

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<sup>2/</sup> In project organizations of this kind it is imperative that track be kept of decisions. In that public agencies, this is usually done through systematic record-keeping and judicious attention to agenda items for committee meetings. In the MEREC project, minutes of meetings indicate that previous minutes are never reviewed and approved. As a consequence, many old agenda items on which decisions were deferred are never brought up again. They simply disappear.

The preceding account of MEREC project organization does not adequately reflect the actual decisionmaking structure. The fact of the matter is that a number of agencies and institutional actors are involved in the decisionmaking process--agencies and actors with whom the municipality would not ordinarily have close ties. They are: USAID, TVA, PSU (Prince of Songkhla University), ORCD/DOLA, and the Changwad.

The functional interrelationships among these agencies is depicted below:



The Phuket Municipality is dependent on external agencies in three main respects. First, in regard to project selection, there is heavy reliance on the TVA advisor as to which activities fall within the scope of the MEREC project, and which do not. The MEREC concept is not well understood by most municipal officials interviewed.<sup>3/</sup> In fact, none of those interviewed could give a clear description of MEREC, although allusion was frequently made to "the MEREC concept." Since the Municipality itself is uncertain as to what MEREC is, it has been left up to the TVA advisor to indicate what kinds of activities fall within the project boundaries.

Second, the Municipality is dependent on PSU for technical assistance, both in the planning phase and during the implementation phase. PSU has been more than an advisor. The Situation Report on Phuket Municipality, which describes Phuket's resources and problems and proposes action programs, was written entirely by the PSU consultant team, although data were supplied by the Changwad and Municipality of Phuket. Some of the project designs (e.g., mine reclamation) also depend on the technical assistance team. It should be noted here that many Changwad officers, in particular staff from the Changwad Health Office and Industry Office, have been instrumental in the planning phase of the MEREC project.

Third, the Municipality relies almost exclusively on USAID for funding assistance. Although the project grant is described as "seed money," and is acknowledged as such by the Municipality, to date no funds have been secured from other external sources.

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<sup>3/</sup> MEREC entails identification of a locality's resources and problems related to those resources. Insofar as possible, interrelationships between various sectors are specified. Strategies and project activities are then selected to make the most efficient use of the resources.

The USAID grant is relatively small, but the disbursement/approval procedure has proved to be extremely time consuming and has created a certain tension between the Municipality and ORCD/DOLA. In order for funds to be released from Bangkok, the Municipality must submit an original voucher to USAID and copies to the Changwad (Office of the Inspector for Local Government Affairs), which then transmits them to ORCD. ORCD must approve the voucher before USAID will release funds to the Municipality.

All bureaucracies have their standard operating procedures--tried and true routines that personnel are accustomed to follow. When an unfamiliar practice is introduced, especially one that departs from standard operating procedures, confusion and delay are apt to result. The disbursement procedure has been a novelty for the Phuket Municipality. For the first time it was required to seek approval from ORCD, an agency with which it had no previous contact. Municipality staff complain that ORCD has been unusually slow in approving vouchers. Municipal records indicate that lag time is between 1-3 months. On the other hand, ORCD points out that the main reason for delay is that vouchers were incorrectly filled out in the first place, thereby necessitating re-submission. ORCD views its role as that of a watchdog/monitor of MEREC, to compensate apparently for the fact that DTEC was not involved in the grant agreement. (DTEC usually performs a monitoring function for government-to-government grants.)

These functional interrelationships have obvious implications for actual decisionmaking structures--implications that are quite at variance with the formal project organization chart. Following Herbert Simon, we conceive of a decision as a choice among alternative courses of action, that rests upon two types of premises, factual and valuational. It follows that the suppliers or controllers of factual and valuational premises, regardless of their position on a formal organization chart, in

fact determine what choices are to be made. In the MEREC Project case, examination of functional interrelationships reveals quite clearly that both factual and valuational premises are supplied by external institutional actors.

Consider first the valuational premises. These are preference orderings about what kinds of project activities should be undertaken. The Municipality has a clear set of priorities that are unambiguously stated in its First and Second Municipal Development Plans (1979-84 and 1985-87, respectively). In both Plans, first priority has been the construction of a piped water system, with road construction and repairs accorded second priority.

MEREC, by contrast, is concerned with "more efficient energy and resource management." Since the Municipality was uncertain as to what this phrase actually encompassed, it has quite naturally followed the guidance of USAID and TVA. Five sectional areas of activities were identified in joint discussions: fresh water; urban waste, economic crops, energy, and urban land. Eleven of the twelve subprojects that were eventually selected are limited to these five sectoral areas; the twelfth subproject is a public relations project to disseminate information on MEREC activities and to promote awareness of "the MEREC concept." Unless one chooses to argue that by accepting the project grant the Municipality was in effect accepting the value premises implicit in the MEREC concept, it is difficult to conclude otherwise than that the valuational premises were supplied in the first instance by the grant awarding agency, in this case USAID/Washington.

This is clearly reflected by many of the MEREC subprojects. For example, the two energy studies, inspection of water meters, and centralized garbage container are activities that the Municipality has adopted at the suggestion of TVA and USAID. The fermentation tank for production of fertilizer project was undertaken at the suggestion of the Changwad Chief Health Officer; the mine reclamation project located

outside municipal boundaries received its chief impetus from the Director of the local Community College. One could take the view that it does not matter whose preferences inform project selection decisions, as long as they serve the MEREC purpose, but to do so would be disingenuous. It is after all the Municipality that is the implementing agency, and the distinct impression gained from interviews with municipal officials is that from the beginning undue accommodation was given to the preferences of external institutional actors.

It should be explained, parenthetically, that at the outset of the Project a "brainstorming" session was held that included Changwad and municipality officials, municipal council members, local community leaders, and other dignitaries. Some municipal council members feel that the inclusion of higher status persons in the initial meeting hindered full and free expression of ideas on the part of municipal officials.

What of the factual premises? Two kinds of facts are of particular salience in the MEREC Project: those having to do with technical know-how, and those having to do with funding considerations. To possess technical expertise is to possess authority in matters requiring informed expert opinion. The majority of the MEREC subprojects are based upon technologies that are unfamiliar to municipal officials, simply because the activities fall outside the normal scope of work. As one municipal official remarked, "I know how to build low cost housing. What I don't know is how to build low cost housing using local materials that may not even meet minimum construction standards." Or, in the traffic master plan project, for example, municipality officials were forced to travel to Bangkok to obtain traffic data on Phuket, and they will have to rely on outside consultants to produce the plan.<sup>4/</sup>

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<sup>4/</sup> Traffic has traditionally been the jurisdiction of the Police Department; traffic master planning is the responsibility of the Office of Policy and Planning, Ministry of Interior. The Phuket Police Department may feel that the Municipality's traffic project is overstepping its jurisdictional boundaries. One indication is that the Department has declined to send a representative to Working Group meetings.

The fact that MEREC subprojects involve unfamiliar technologies has created a dependency on external technical assistance, primarily on the PSU consultant team. In other words, because of its technical expertise, the PSU team has had a key say in decisionmaking. It would not be going too far to say that the Situation Report could not have been produced were it not for PSU. Yet there have been problems. Municipal officials possess practical experience and a familiarity with local conditions, whereas the PSU consultants do not. In some instances this has led to differences of opinion on what the "facts" really are.

Finally, in its decisionmaking the Municipality is constrained by conditions attached to the Project grant. Certain projects which the Municipality would have preferred were excluded because they entailed the purchase of heavy equipment. In fact, many officials interviewed said that a prime consideration in the selection of MEREC subprojects was that they should not involve extensive use of capital equipment, thereby restricting the Municipality's options.

The MEREC Project grant from USAID is \$250,000: \$75,000 for Planning (Phase I), and \$175,000 for Implementation (Phase II). In Phase I, \$10,800 was allotted to logistic support; \$40,000 to consulting contracts for technical assistance; \$15,000 to attendance at conference and training seminars (out of the country); \$7,200 to local workshops and seminars, as well as publication and dissemination of program information; and \$2,000 as contingency.

The \$175,000 of the USAID Project grant for the Implementation phase is to be supplemented by \$19,400 from DOLA and \$26,000 from the Municipality of Phuket. The grant total amounts to \$220,400 or an average of just over \$18,000 for each MEREC subproject. Obviously, this budgetary constraint imposes limitations on the types of project activities that can be undertaken. Admittedly, the Municipality understands that the MEREC grant is seed money, but it is not clear what other sources of funding remain to be tapped. The municipal budget is in the order of \$2.5 million, but the Municipality must presumably allocate its funds according to its own priorities (piped water, road construction and maintenance, etc.).

In regard to the question of who ought to have authority to decide, differences of opinion that may adversely affect the Project have emerged in regard to the role of ORCD. ORCD is designated in the Project Agreement as a participant in the preparation of work plan, financial plans, and itemized budgets. It is to assist the Municipality of Phuket in carrying out all phases of the MEREC Project. It is to review and approve, together with TVA, documentation for quarterly advances.

Officials from Bangkok central line ministries sometimes give an impression of condescension or appear arrogant if not abrasive in face-to-face interactions with local authorities. Whether intended or not, this seems to have happened with ORCD in Phuket. Personality conflicts aside, it does not help matters that ORCD's claims to technical expertise have not found acceptance, the Municipality apparently dubious that young PC-level 4 officials with but a single year's experience working on a UNESCO project would possess sufficient expertise to act as MEREC project coordinators. The two officials in question have recently been assigned on a part time basis to the MEREC Project. The assignment, unsolicited by the Municipality, was made after ORCD turned down the Municipality's request to hire a full-time Project Coordinator. The Mayor, however, has expressed a willingness to work with the two officials on a 3-month trial basis.

If the Municipality feels ORCD intervention somewhat unwarranted, ORCD to the contrary appears to think that the Municipality and USAID have assigned to it the role of a rubber stamp. ORCD claims that it has been presented for approval with a series of decisions that have already been finalized by the Municipality and USAID, that its advice and guidance have never been seriously sought. Since ORCD interprets the Project Agreement as giving it the right to participate as an active partner, i.e. decisionmaker, in the MEREC Project, it is hardly surprising to find that its relations with both the Municipality and USAID are strained.

B. Brief Survey of Organizations and Individuals in Bangkok That Could Potentially or Must (Because of Existing Statutes) Play a Role in Phuket's Municipal Development

In the Thai administrative system, municipalities are designated as local self-governments. The prefix "self" belies the actual state of affairs. Municipalities are fully autonomous neither with respect to budgets, nor personnel, nor policies. In general, about one-quarter of municipal revenues are grants-in-aid by the central government, which exercises control over program expenditures. Moreover, municipal budgets must be approved by the Changwad. In case of conflict, the matter is routed to DOLA, then to the Permanent Secretary of Interior.

All municipal employees come under the jurisdiction of a central Commission analogous to the Civil Service Commission. The Commission is headed by the Minister of Interior and includes among its board members the Permanent Secretary of Interior, the Directors-General of DOLA, Public Works, and the Comptroller-General's Departments, as well as the Secretary-General of the Civil Service Commission. All higher level appointments (PC 5 and above) are made by the Commission. Assignment to any municipality is in reality a tour of duty assignment, and it is quite common for officials to be transferred from the North to the South, from the South to the Northeast, etc.

With respect to policies, municipal development plans are required to be in line with the National Economic and Social Development Plan. Municipal plans must be approved by the Ministry of Interior.

Within DOLA, two Divisions have primary responsibility for overseeing municipalities. They are the Division of Local Government Affairs which has an office in every Changwad, and the Local Finance Division, which is in charge of disbursement and approval of local funds.

In addition to these two Divisions, a third unit in DOLA exercises a control function with respect to the Phuket Municipality. This is the Office of Regional Cities Development. Created for the primary purpose

of coordinating a World Bank loan for the development of provincial cities designated as growth centers, ORCD became involved with the Phuket Municipality because of USAID's decision to place the MEREC Project in this Office. It seems that ORCD will have a greater say in municipal development planning in future, because Phuket has been designated a primary city in the next National Development Plan. As such, its plans must be reviewed and approved by ORCD.

Municipal jurisdictions are determined not only by legal statutes but also by the national government. For example, although provision of piped water is a municipal responsibility by law, the Cabinet ordered last year that municipalities should cede this function to the Provincial Waterworks Authority, in the interest of "effective planning." Phuket is currently contesting this order, however, and is proceeding with the MEREC subproject to inspect water meters. Traffic control is another stated municipal function, but designing master traffic plans is under the authority of the Office of Policy and Planning, Ministry of Interior.

C. Brief Progress Report on MEREC Contractors Funded by Project Funds

There is only one MEREC contractor funded by Project funds, namely the PSU consultant team, consisting of six engineering faculty, one economist, and one agriculturist. The PSU team has been instrumental in preparing the Situation Report on Phuket Municipality and in assisting municipal officials to formulate their workplans for the subprojects. By and large, working relations with the Municipality and the MEREC working groups have been harmonious and mutually beneficial.

Nevertheless, no working relationship is totally without its problems, although in the MEREC Project these have been relatively minor. PSU had initially expected to take more of an advisory, and less of a lead role in preparing the Situation Report. Some of the

consultants indicated in interviews that they would have preferred a faster pace of work and a more organized approach on the part of the Municipality and working groups. The impression gained from interviews is that each side is waiting on the other to take the initiative in implementing the subprojects. The Municipality fails to proceed with work because it is waiting on PSU for additional data, detailed specifications, etc. PSU on the other hand, is not sure about the timing of its inputs to the Municipality, since the Municipality has not come up with precise time schedules.

Although all municipal officials interviewed spoke favorably of the PSU team, a few expressed reservations regarding the feasibility, or indeed the desirability, of some of the team's proposals, especially in regard to construction materials for the low cost housing project. The MEREC strategy calls for utilization of local resources. PSU is therefore experimenting with alternatives, to the scepticism of some municipal engineers who have raised questions about durability, cost effectiveness, and maintenance of general construction standards.

D. Review of Present City Development Plans in Comparison with the MEREC Development Plan

On its own initiative, Phuket drew up its first Municipal Development Plan in 1979. The Mayor sought and secured assistance of a Division Director in the National Economic and Social Development Board to devise the Plan, which ended in 1984. The present Plan is a response to a Cabinet directive to secondary cities to formulate their plans in accordance with the goals of the National Development Plan. It runs for three years until 1987, to coincide with the termination date of the current National Five-Year Plan.

In each instance, however, the planning process has been more or less the same. First of all, identification is made of problems and priorities are established. Next, projects are listed that are designed to provide remedial action in each problem area. No review is made of budget estimates, in terms of projected revenues and expenditures. In fact, Municipal Development Plans resemble the development plans of most other public sector agencies. They are indicative of the course of action an agency would like to take. The list of projects is more of a "wish list" than a statement of what will occur. It tells "what," but not "when" and "how."

The Municipality's current Development Plan lists four areas for development: basic infrastructure, economic development, social development and administrative development. Seven major problem areas requiring attention are listed in order of priority as:

1. Inadequate and substandard piped water services;
2. Inadequate and substandard roads and footpaths;
3. Inadequate drainage system;
4. Overcrowded living conditions;
5. Drug addiction;
6. Inadequate public health and nutritional services;
7. Low levels of public safety.

In drawing up the Plan, a 19 member committee was appointed to identify problems, determine priorities, review alternative solutions, and select projects. The committee consisted of 5 municipal officials (including the Mayor and 3 council members), and 14 "qualified" persons,

either local inhabitants or other persons with suitable qualifications. Two full-time staff in the Municipality's Planning Division carry out day to day operations.

Although municipal planning staff have been assigned to MEREC, their role has been negligible thus far. During some of the interviews a marked lack of interest in and understanding of the Project was evidenced. In fact, MEREC strategies run counter to planning procedures established in Thai government agencies, be they central, provincial, or local government. The basic difference is that agency plans are invariably problem oriented (first identify problems, establish priorities, then search for solutions); whereas MEREC strategies are directed at increasing "efficiency in the use of urban resources such as energy, wood, land, and water."<sup>5/</sup> The same publication goes on to state that for "each MEREC city the sectors of greater importance for achieving efficiencies in the chosen resources will be unique... After critical resources have been related to key sectors, a MEREC strategy is developed for each resource."

It follows from this statement of strategy that MEREC activities do not necessarily coincide with the Municipality's list of problem priorities. Nevertheless, the fact that six or seven of the twelve MEREC subprojects have been incorporated into the current Municipal Development Plan is indicative that the Municipality is serious about MEREC. The six subprojects are: mine reclamation (appears on page 37 of the Municipal Development Plan); studies of cash crops for investment promotion (page 44); demonstration of low cost housing (page 48); construction of centralized garbage container (page 52); sanitary landfill (page 52); and bio-gas generator (page 52). The traffic master plan may or may not be included: page 56 of the Municipal Development Plan lists an unspecified traffic project.

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<sup>5/</sup> Managing Energy and Resource Efficient Cities, United States Agency for International Development, TVA/OECD/CD-83/52, p 1 (no date).

Two subprojects are of recent origin, so there may not have been enough time to include them in the Municipal Development Plan. They are: inspection of water meters and information dissemination on MEREC.

Storage of rainwater for household consumption is apparently not listed in the Municipal Development Plan, but the Municipality is proceeding with the project in any case.

Two more subprojects have also been left out: fermentation tank for making fertilizer and analysis of energy needs. In fact energy as such is not mentioned anywhere in the Municipal Development Plan.

One should not claim that MEREC has made a substantive difference to ongoing municipal development planning. Rather, MEREC has identified sectoral areas and projects which would not ordinarily have been included in municipal plans (e.g., traffic master plan, mine reclamation, analysis of energy needs, construction of centralized garbage container, construction of low cost housing using local materials).

A question that may be raised at this point has to do with the acceptance of these projects by the public and by other government agencies. Without wishing to cast a dampener on municipal initiative and innovation, one should caution that straying afield from traditional jurisdictions may lead to negative reactions. Both the mine reclamation and low cost housing projects are sited outside city limits, leaving some citizens interviewed to wonder whether the Municipality should not be attending to more pressing problems within the city itself. Moreover, the mine reclamation project may lead to additional dependencies on central government agencies, notably the Forestry Department and Department of Mineral Resources, especially with respect to securing funding assistance.<sup>6/</sup>

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<sup>6/</sup> The words "city" and "municipality" are not coterminous. This could lead to problems in implementing MEREC-type projects, because MEREC emphasis on "cities" ipso facto precludes restricting activities to within municipal limits.

The methods under which the MEREC Action Plan and the Municipal Development Plan were formulated are somewhat different. The latter is primarily an in-house activity, with selected inputs made by local citizens and Changwad officials. The lead is taken, however, by the Mayor and his council. The MEREC procedure, by contrast, involved holding a "brainstorming session" to which important sector representatives were invited.<sup>7/</sup> These sector representatives fully participated in generating ideas for subprojects. The only drawback, as has been mentioned already, is that many subprojects, however worthy, are not fully congruent with the Municipality's own development priorities as expressed in the Municipal Development Plan. This may lead to problems during the implementation phase later on, especially when one takes into account the fact that the Mayor's term of office ends in July 1985.

Since it is to be expected that senior officials will be transferred out of Phuket with each annual reshuffle, it is imperative that MEREC procedures and project rationale become firmly established in the collective organizational memory and in the ongoing institutional process. Unless this occurs, there remains the possibility that the MEREC concept will cease to inform decisionmaking and planning once the subprojects are completed.

E. Comparison of the DDMP Project Approach and MEREC Strategies for Fostering Local Management Capabilities

In a sense, to compare the DDMP Project approach and MEREC is like comparing apples and oranges. Tambon councils and municipalities are quite disparate entities, especially in regard to legal authority, administrative structure and jurisdiction, and budgets. Tambon councils operate in rural areas; municipalities are by definition urban.

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<sup>7/</sup> These consisted of Changwad officials, the local community college, and prominent local citizens as well as the Mayor and municipal officials.

Technically, municipalities are known as local self-governments. Although they are hardly as independent as municipalities in, say, the United States or the Philippines, their autonomy, however restricted, is still far greater than that of tambon councils. Lest we forget, the tambon is a de facto extension of central government. Finally, in terms of the power of the purse, tambon council funds, derived entirely from the central government, seldom exceed 500,000-800,000 baht per annum. The Municipality of Phuket's budget for fiscal 1985 was in the order of 67 million baht.<sup>8/</sup>

Nevertheless, both DDMP and MEREC have the stated purpose of fostering local management capabilities. One may compare these two projects on a number of dimensions.

1. Intended outputs. DDMP is supposed to produce a "formula" for development projects and plans at the tambon level. The DDMP process is directed toward identifying what works, what does not, and presumably why. DDMP projects serve the purpose of test instruments, but are not per se intended outputs. Failures are acceptable so long as they contribute to the learning process. MEREC, on the other hand, was never intended to come up with a "blueprint" for development. Basically, the MEREC concept involves getting people to think about resources and interconnections among resources in order to make the most efficient use of them. The Situation Report describing the status of various resources is one tangible output. MEREC project activities are derived from the preceding process. Because they constitute intended outputs of MEREC, implementation failure might create a serious loss of confidence in the Project as well as weaken its sustainability.

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<sup>8/</sup> Municipal boundaries encompass 12 square kilometers, with a population of some 45,000 inhabitants.

2. Organizational arrangements. DDMP and MEREC are both ad hoc projects undertaken as a result of USAID initiatives. Organizational arrangements reflect the temporary character of the two projects. Thai bureaucracy has a fairly limited repertoire: the standard response when unsolicited projects appear is to create some kind of executive or steering committee to oversee the activities of working groups. Membership on committees and working groups is simply decreed. Either agencies are requested to send representatives, or individuals are designated by name. In either case, consent of the agency or individual is rarely sought. In neither DDMP nor MEREC is membership on a committee or working group a full-time duty assignment. On the contrary, these projects have to be managed in addition to the regular workload. In this sense, they are "extra curricular."

Against this backdrop, commitment to fulfilling a project's purpose becomes a function of two factors: the extent to which a project is directly relevant to a line agency's annual action plan or long term development plan, and the amount of time and interest each individual committee member has to spare for the project. In the case of DDMP, it is obvious that the project was (as of June 1984) quite peripheral to the line agencies involved. Individual committee members' commitment was also noticeably low, an observation that has already been discussed at length in the DDMP Mid-Term Evaluation Report. MEREC is quite different. Although some municipal officials complain about the "extra burden" that MEREC places on their time, they clearly view the Project as "belonging" to the Municipality.

No organization can function without decisionmakers--individuals that either by virtue of their position or their expertise are empowered to decide. This may sound so obvious as to need no statement. Yet every now and then project organizational structures are designed that inadvertently leave out such elementary considerations as, "Who has authority to tell whom what to do? Who has authority to decide?" DDMP is a perfect illustration. The power to decide, to issue orders, was vested

in a committee that met so infrequently as to be ineffectual. Neither the REGP Secretariat, nor the DDMP Working Group, had the power to make key decisions. Management and implementation of day-to-day project activities was farmed out to TAT, a so-called "team" of technical advisors drawn from three private sector consultant firms. The introduction of an extra-bureaucratic organization to work closely within the Thai bureaucracy calls for unusual skill and finesse if a harmonious and effective working relationship is to develop. The verdict on TAT is still out.

MEREC faces no such problems. The Project is indisputably located within Phuket Municipality. However constrained it may be in its decisions (see discussion of this in Section A), the Municipality and its Mayor can and will act.

3. Project strategies and activities. One of the primary objectives of DDMP was to "understand and explain, through a systematic documentation process, the on-going processes which affect the planning and implementation of development activities." Moreover, DDMP was to "develop comprehensive, integrated, and on-going learning and action systems which will continuously strengthen the planning and implementation capabilities of amphoes and tambons." In order to achieve these objectives, ten districts in five Northeastern provinces were designated as a "learning laboratory" in which to analyze the local development process, determine its requirements, and develop effective approaches to local capacity building. Within each province, two full-time staff from TAT (technical assistance team) were assigned, one to observe and document key processes at the tambon and village levels, the other to work primarily with provincial and district officials and "serve as a catalyst in focussing the attention of provincial working group members on key issues relevant to strengthening local capabilities."<sup>9/</sup>

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9/ DDMP Mid-Term Evaluation Report, p. 13

The DDMP strategy is to observe, to document, and to act as a catalyst in focusing appropriate levels of government attention on key issues related to strengthening local capabilities. In this context, DDMP subprojects at the tambon level should be viewed as test instruments, as part of the experiment to find out what works, what doesn't, and for what reasons.

MEREC strategies are different. Here, the focus is on managing local resources, in the process of which it is hoped that local management capabilities will be strengthened as well. If DDMP can be characterized as, "Watch and see what works," with a few "experiments" thrown in for good measure, then MEREC is clearly "Learning by doing." Whereas the TAT team plays a pivotal role in DDMP, in MEREC full responsibility is assumed by the Municipality.

Unavoidably, perhaps, in both DDMP and MEREC the subprojects, rather than the Project rationale, are the most visible elements at the local level. The subprojects are tangible, and therefore "easy to understand." But TAT, REGP, and Minister Meechai Ruchupan himself have never lost sight of the overall objective of DDMP, even though there have been differences of opinion as to what the Project is "really" about. Unfortunately, this macro perspective may be disappearing in Phuket. Having identified subprojects, the Municipality is focusing all its attention on their implementation. In interviews conducted in February and April this year, most respondents could not remember the underlying rationale for the subprojects. Since resource management, rather than project implementation per se, is the *raison d'etre* for MEREC, it is imperative that the collective organizational memory be refreshed, otherwise MEREC may turn out to be yet another case of not seeing the forest for the trees.

4. Fostering local management capabilities. Since the DDMP approach with respect to fostering local management capabilities is essentially to observe and document what works, in order to come up with a recipe for action (more or less), not until such a recipe is produced and implemented can one assess whether or not tambon management capabilities have indeed been fostered. In the MEREC case, it is quite clear that the Municipality already possesses management capabilities. This is not to say that the Municipality has achieved its full potential in respect to those capabilities. Clearly it has not. MEREC has placed additional demands on municipal officials' time, and internal administration leaves much to be desired. But these considerations aside, the MEREC subprojects themselves do not actually call for management capabilities over and above what the Municipality already possesses. We should note that the Municipality currently has a full-time staff of 500 and almost 300 temporary employees. Its budget is among the largest in the country. In perspective, the MEREC Project grant annually amounts to just 3.3 per cent of the municipal budget--one should not expect a drop in the bucket to make a big splash.

F. Identification of MEREC Strategies Which May Be Useful on a Regional or National Basis

If MEREC is to be singled out from most projects undertaken with donor-initiated technical assistance grants, it is on account of the fact that the grantee, in this case the Municipality of Phuket, has demonstrated a level of cooperation for greater than is usually to be found. Even though at the time of this writing some of the initial enthusiasm has waned, owing in part to internal and external management problems, the Mayor and many of his officials reiterate that they want MEREC to be a success, that they intend Phuket to be a showcase as a MEREC demonstration project for the rest of the country.

The Municipality's positive attitude probably derives not so much from a commitment to the MEREC concept--which it is rather hazy about--than it does from a number of other factors. This is the first technical assistance grant that the Municipality has ever had. There is, therefore, the novelty factor. Moreover, there is promise that, if MEREC is successful, Phuket will be a showcase for Thailand. That also is pleasant to anticipate. In Thailand, decentralization has been more of a pious hope than a watchword for action. The development of strong local self-government has, in consequence, been noticeably absent. It should occasion no surprise, therefore, that even the smallest initiative, such as a MEREC Project, would be welcomed by municipalities.

Of course, how the Municipality and other participants in the Project will ultimately view MEREC depends mainly on whether or not the Implementation Phase is successful. There are several factors which, in our view, operate in favor of the Project. First, many of the subprojects can be implemented by the Municipality itself, without relying on external assistance. The less the dependency on other institutional actors, the greater the likelihood of success, simply because decisionmaking is rendered less complex and uncertainty is reduced. It is when a project requires complex coordinative mechanisms and has to satisfy the preferences of all participating agencies that costly delays and breakdowns are likely to result.

Second, each subproject can more or less be executed independently of the rest, thus assuring that implementation failure in one subproject will not adversely affect the chances of success of the rest. --This is less true, however, of the mine reclamation subproject, which is linked to several other subprojects.

Third, with the exception of mine reclamation, the subprojects are relatively small. In other words, they are feasible. Even so, however, Phuket Municipality may have overextended itself in terms of the number of projects it can reasonably expect to accomplish in the next eighteen months, given existing budgetary and personnel resources.

The MEREC concept constitutes a departure from conventional approaches to municipal planning and development in that it focuses initial attention on identification and management of existing resources, rather than starting out with listing problem priorities. Not to state the difficulties that an extension of MEREC to other municipalities is likely to encounter would be a disservice given the purpose of this report. The dilemma is the following: If MEREC is kept relatively small, as in the Phuket case, then chances are that project activities will turn out to be peripheral, rather than central, to municipal development, which may result in a gradual decline in interest and commitment to the project; if MEREC increases considerably in size, however, it may well come into conflict with the planning principles currently in operation in Thai local government.

It may be possible to resolve the dilemma, however. For example, municipalities that wish to employ MEREC strategies may use as a point of departure their own Development Plans, from which they can then proceed to identify clusters of activities and subprojects that fit the MEREC concept. In this way, they would be focussing in on sets of activities that could be accorded priority within the overall context of their respective Development Plans. This procedure may prove of benefit in several respects. First and foremost, it incorporates MEREC into the mainstream of municipal planning, not only ensuring continuity but also relieving MEREC of its ad hoc status and concomitant dependence on the Mayor for leadership and direction. Moreover, credibility is provided for future budgetary allocations and funding requests.

The MEREC Project has been in existence for only 15 months or so. It may be somewhat premature, therefore, to be making recommendations regarding extension to other areas at this stage. Based on our observations of the project to date, however, we will venture the following:

If MEREC strategies were to be applied elsewhere in Thailand

1. Thought should be given as to which administrative level should be responsible for implementation: the national government, the Changwad, or local government. For the MEREC concept to be fully operable, the Changwad would seem the best choice. In terms of strengthening local management capabilities, however, the Municipality is more suitable, for obvious reasons.
2. If local government is selected as the implementing agency, clear cut agreement must be reached with DOLA beforehand as to the precise nature of DOLA involvement and control. Quite importantly, DOLA should not be manipulated or coerced into an agreement.
3. MEREC subprojects should fit into the framework of project activities as specified in existent development plans to ensure that they correspond with already determined priorities.
4. Given funding constraints, concentration of MEREC Project resources on a small set of subprojects might be more effective than having many subprojects.
5. Keeping the number of institutional actors involved down is a good idea because it reduces coordination costs.
6. Attention should be paid to internal administrative and organizational arrangements--but organizational design becomes less problematic if MEREC can be incorporated into the ongoing planning framework from the beginning.

**A N N E X E S**

METHODOLOGY

Personnel: Suchitra Punyaratabandhu-Bhakdi, Ph.D. Political Science  
Graduate School of Public Administration  
National Institute of Development Administration

Interview Methodology:

In-depth interviews were conducted lasting 1-2 hours on average. In some cases, re-interviews were conducted. No printed questionnaires were used, but the interviews were on the whole structured by the Scope of Work.

SCHEDULE

Friday, January 11, 1985

0800-1200      Project Overview; Interview with Mr. James Gober, TVA  
Consultant; receive project documentation from Project  
Officer - USAID

Thursday, January 24, 1985

0900-1030      Interview with Dr. Chamlong Atikul, MEREC Advisor - NIDA

Friday, February 1, 1985

0830-1230      Review project documentation

1330-1730      Review project documentation

Monday, February 4, 1985

1830            Leave Bangkok Airport

1935            Arrive Haadyai Airport

Tuesday, February 5, 1985

0830-0930      Interview with Mrs. Prapai Inthakas, Phuket Deputy City  
Clerk - PSU

0930-1000      Interview with Ms. Sasatorn Sukrangsarn, MEREC Process  
Documentator - PSU

- 1000-1100 Interview with Dr. Chullaphong Chullabodhi, Energy Consultant - PSU
- 1100-1230 Interview with Dr. Pichai Taneerananon, PSU Coordinator for MEREC - PSU
- 1430-1530 Interview with Dr. Thongchan Hongladarom, PSU Rector-PSU
- 1530-1730 Review interview notes

Wednesday, February 6, 1985

- 1520 Leave Haadyai Airport
- 1550 Arrive Phuket Airport
- 1700-1845 Interview with Ms. Rakngam Tongtan, MEREC Project Secretary - Tavora Hotel

Thursday, February 7, 1985

- 0730-0830 Continuation of interview with Ms. Rakngam - Phuket Municipality
- 0830-1000 Interview with Mayor Kasem Suttangkul - Phuket Municipality
- 1030-1130 Interview with Councilman Charoen Klattikul - Phuket Municipality
- 1300-1345 Interview with Mr. Chockiat, Planning Officer - Phuket Municipality

- 1345-1430 Interview with Ms. Supit, Planning Officer - Phuket Municipality
- 1430-1530 Interview with Mr. Somphop Koovanichkul, Assistant Director of Municipal Engineering Division - Phuket Municipality
- 1530-1630 Interview with Mr. Manit Boonsanong, Deputy City Clerk - Phuket Municipality
- 1930-2100 Interview with Acharn Sumon Khongsawad, Director of PSU Community College - PSU Community College, Phuket

Friday, February 8, 1985

- 0930-1045 Interview with Khun Pichit Pongrapeeporn, Provincial Industry Officer - Provincial Industry Office, Phuket
- 1100-1215 Interview with Mr. Somboon Aiyarak, Public Health Officer - Provincial Public Health Office
- 1330-1430 Interview with Mr. Anurak Tarnsiriroj, private sector - Municipality Public Health Office
- 1500-1600 Interview with Mr. Chalerm Tongtan, Municipal Council Member-Municipality Public Health Office
- 1615-1700 Interview with Mrs. Somchai Suvannasupana, Municipal Council Member - at her home
- 1840 Leave Phuket Airport
- 1950 Arrive Bangkok Airport

Monday, February 11, 1985

0800-0930 Interview with Dr. Thawee Limsonboon, Director of Municipal Public Health - USAID

1000-1130 Interview with Mr. Manit Panichkarn, Director of Municipal Engineering Division - USAID

Tuesday, February 19, 1985

0830-1730 Review interview notes and project documentation

Thursday, March 21, 1985

1500-1800 Interview with Mr. James Gober, TVA Consultant, and Mr. Avrom Bendavid-val, AID/Washington - USAID

Tuesday, April 2, 1985

1930 Arrive Phuket Airport

Wednesday, April 3, 1985

0900-1200 Observe MEREK Executive Committee Meeting - Phuket Municipality

1300-1500 Observe Mine Reclamation Project Meeting - Phuket Municipality

1500-1630 Site visit to mine reclamation project

Thursday, April 4, 1985

0900-1200      Observe Working Group meetings - Phuket Municipality

1300-1500      Observe budget preparations - Phuket Municipality

1650            Leave Phuket airport

1820            Arrive Bangkok airport

Monday, April 8, 1985

1000-1130      Interview with Dr. Pirapol Tritasavit, Director of ORCD -  
ORCD

Tuesday, April 9, 1985

0800-1700      Review Phuket Municipality's Three Year Plan; prepare  
report outline

Thursday, April 11, 1985

1500-1645      Interview with Mr. Kasem Srinian, MEREK Project Officer -  
NIDA

April 16 - 30, 1985      -Preparation of final report

SCOPE OF WORK

ARTICLE I - STATEMENT OF DUTIES

A. Objective

The objective of this consultancy is to compare development strategies in the DDMP project and the MEREC project, useful approaches will be identified for improvement of local management in rural and small urban areas in Thailand.

B. Scope of Work

A report will be prepared examining to what extent the MEREC project purposes are being accomplished with the mechanisms specified in the MEREC Project Grant Agreement. The report will include:

1. A description of MEREC decision-making structures (formal and informal).
2. An analysis of the roles and interrelationships of organizations involved with MEREC activities.
3. A brief survey of organizations and individuals in Bangkok that could potentially or must (because of existing statutes) play a role in Phuket's municipal development.
4. A brief progress report on MEREC contractors funded by project funds. This report should relate to points 1 and 2 above.
5. A review of present city development plans in comparison with MEREC development plan.
  - Are previous plans different from those plans produced under MEREC?
  - Are the methods by which the city development plan under MEREC was formulated substantially different or improved?
6. A comparison of the DDMP project approach and MEREC strategies for fostering local management capabilities.
7. Identification of MEREC strategies which may be useful on a regional or national basis such as:
  - Methods for improving municipal management.
  - Approaches for involving of local private sector interests in municipal development.

MEREC Project BudgetSummary Budget - Life of Project  
(in U.S. Dollars)

ITEM	AID <u>1/</u>	RTG	
		DOLA <u>2/</u>	MPK <u>3/</u>
<u>I. Planning (Phase I)</u>			
<u>A. Logistic Support</u>			
1. Salaries for DOLA and MPK staffs	-	1,000	6,500
2. Travel and Per Diem	3,000	5,600	-
3. Supplies and Materials	3,000	-	-
4. Clerical support	-	-	1,200
5. PDL for vehicles of ORCD and MPK	1,800	-	1,000
6. Procurement of Typewriter (2 units)	3,000	-	-
<u>B. Technical Support and Consultancies</u>			
1. Attendance at Conference and Training Seminars	15,000	-	-
2. Consulting Contracts for technical assistance	40,000	-	-
3. Local Workshops and Seminars	5,200	-	-
4. Publication and dissemination of program information	2,000	-	-
Contingency	2,000	-	-
<u>Sub-Total:</u>	75,000	6,600	8,700
<u>II. Implementation (Phase II)<sup>4/</sup></u>	175,000	19,400	26,000
<u>Grand Total:</u>	250,000	26,000	34,700

1/ Grant funds may be used to cover foreign exchange costs

2/ The Department of Local Administration

3/ The Municipality of Phuket

4/ Activities will be implemented in accordance with results of the Planning Phase

MEREC SUBPROJECTS

Water sector projects

- 1) Water meter calibration and leak detection.
- 2) Construction of rainwater storage demonstration tank.

Urban waste sector

- 1) Sanitary landfill in mangrove area.
- 2) Fermentation tank for making fertilizer.
- 3) Centralized rubbish container.
- 4) Bio-gas generator.

Economic development sector

- 1) Study and development of markets for rubber sheet product, rubber wood, coconut, coconut wood, cashew, and promoting private sector investment.

Energy sector

- 1) Analysis of total energy consumption and need in Phuket.

Urban land sector

- 1) Mine reclamation.
- 2) Traffic System improvement.
- 3) Demonstration of the use of local materials in the construction of low-cost houses which also feature the efficient use of energy.