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CONSULTANT TECHNICAL REPORT
SOCIO-ECONOMIC ANALYSIS (SEA) STAFF
BUREAU OF CENSUS

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CONSULTANT TECHNICAL REPORT
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Background

This particular project (socio-economic analysis) is carried out under terms of a broader Participating Agency Service Agreement (PASA) entitled "Population Data Systems." As such the substantive monitoring is the responsibility of the AID Population Policy Division with financial and budget overview exercised by the Demographic and Economic Analysis Division.

This report deals principally with the technical assessment of SEA Staff activities. Recommendations concerning how the three projects dealing with demographic socio-economic analysis (PLATO; GE-TEMPO; SEA Staff (LRPM)) can be better coordinated by eliminating overlap and duplication of objectives will be covered in a separate report. It should be said at this point, however, that the construct and methodology employed by the SEA Staff in the application of their various models is technically the best of those prepared for AID.

The Sea Staff did not formally come into being until July 1972. For more than a year previous, H. Albert Green, operating as part of the International Statistics Programs Center (ISPC), had been engaged in demographic-economic analysis. In 1971, he had been sent to Thailand to help install the TEMPO I model program. Extensive modifications were made to the TEMPO I model program after arrival in Thailand to have it more adequately fit local conditions. This adaptation was called LRPM1 and was used by Thailand until a different computer system was installed in the following year. Local programmers were unable to rewite the LRPM1 program following the change of computers, so continued benefit from the use of this model was not possible. At the present time, however, a new country request has been received from Thailand for SEA Staff services in which the LRPM2 model will be utilized. (LRPM1 is a simplified aggregative model designed for a specific computer. These limitations have caused it to be dropped from the SEA programs.)

The SEA Staff has since developed more sophisticated models called LRPM2, LRPM3 and LRPM4/PDM (in conjunction with Purdue University). Some studies on development

problems, such as rural-urban migration and world food grain supplies, have also been undertaken.

During the two year period from July 1972 through July 1974, the SEA Staff expanded from one to ten professionals. Results did not seem commensurate with the size of the effort, and an assessment of the SEA Staff was made by Duncan Miller of the Population Policy Division in mid-1974. The major findings of this review are summarized in a memorandum from Joseph E. Quinn, Chief, Socio-Economic Analysis Staff on November 11, 1975.

> "The general assessment of (SEA Staff) achievements up to July of 1974 was quite critical: The LRPM models were difficult to use and had not been adopted by any less developed countries. The other statistical packages were unnecessary duplications of already existing work by others. The basic documentation was remarkably unreadable. Most of the studies in new areas seemed to be dead ends in the sense that nobody made any use of them."

As a result of these criticisms, the SEA Staff was completely reorganized. The professional staff was cut from ten to four persons none of whom, including the Director, Joseph Quinn, had been involved in the earlier work. In the approximately year and a half of operation by the new group considerable effort has been made to improve the program and to make a real contribution to the objectives and goals of the AID population program. This report will focus on this period.

I. ACTIVITY DESCRIPTION AND ASSESSMENT

The section of the PROP dealing with SEA Staff activities lists seven key indicators and measurements related to the project purpose. Each of these indicators will be discussed under the headings which follow. The first two indicators are so closely linked that they will be discussed concurrently.

1. COMPREHENSIVENESS OF THE MODELS IN ANALYZING THE INTERRELATIONSHIPS BETWEEN DEMOGRAPHIC AND SOCIO-ECONOMIC VARIABLES. MEASUREMENT: VARIABLES INCLUDED IN MODEL REFLECTING POPULATION IMPACT.

2. ADEQUACY OF DOCUMENTATION REGARDING USE OF MODELS. MEASUREMENT: MANUALS PREPARED THAT CLEARLY DESCRIBE THE USE OF MODELS.

There are three models in the LRPM series: 1) LRPM2; 2) LRPM3; and 3) LRPM4/PDM. Each of these represents a higher level of sophistication and application than the preceding one. A beief overall description is given as follows: (Joseph E. Quinn, The Use of the LRPM Models in Making Population Projections for Development Planning. September 1975.)

> "LRPM2 is the simplest model and is designed for use in the least developed countries. In many but not all ways, it is quite similar to the better known TEMPO models. LRPM2 tracks people by their age groups and projects flows such as the number of students, but does not keep track of stocks such as the number of high school graduates. LRPM3 tracks people by their age and education level and offers more variations of vital rate parameters, and keeps track of stocks. LRPM4/PDM is still more sophisticated in its uses of data and presently is designed to focus on the agriculatural sector and its interrelations with the rest of the nation."

A. LRPM2

In the last year, SEA Staff effort has concentrated on revising LRPM2. All of the subroutines previously listed by the predecessor staff have been substantially revised, improved and rendered trouble free. Preparation of the necessary documentation is in process, but considerably more work needs to be done. Program listings and sample runs are available for nearly all submodels. Methodological manuals, which explain the concepts and reasoning involved in the design of the submodels, are not yet prepared. SEA

Staff, however, has prepared in first draft "input" manuals covering eight of the submodels. These explain basically what is to be done and how to do it. The "what" part of the input manuals indicates the methodology being used, but does not explain why a particular methodology was chosen, the conditions under which it is most appropriate, or the underlying reasoning involved in making certain assumptions or estimates. Although methodological manuals are at present intended to be issued separately, it may be more convenient for the user to have the methodology explanation combined with the material contained in the input manuals.

The submodels available under LRPM2 and the status of documentation is given in Table 1. Other developments in table formating and graphics are underway and can make important new contributions. The LRPM2 is the basic analytical tool of the SEA Staff and is ready for use and installation in developing countries.

Since mid-1974, the LRPM2 computer program has been changed to overcome several problems; such as the failure of old routines to work, methodical errors and built-in arithmetic mistakes, and undocumented mystery routines. The present program makes it easier to determine the proper formats for inputting data to run the model and has an increased number of debugging routines so that errors in the program can be traced more easily. The kinds of data that can be printed out has been expanded and more intermediate calculations have been retained for purposes of analysis.

The documentation, unfortunately, has not kept pace with changes and improvements in the submodels. The input manuals which describe the model's basic methodology and characteristics are in draft form only. The descriptions are less than adequate in several respects and occasionally still reflect earlier usage prior to revision of the models. The manual covering the demographic model is still written in terms of UN age-specific birth rates and survival rates, although in practice the Coale Demeny Regional Life Tables or fertility patterns derived from country experience are more frequently used. LRPM2 is designed to be completely flexible in the kinds of inputs used, but the methodology descriptions fail to adequately indicate this flexibility.

Elsewhere the terminology sometimes tends to be confusing or unclear. Age-specific birth rates applying to a specified year are described as point rates; those applying to a five-year interval are called period rates. General usage is to refer to age-specific birth rates applying to any time

Table 1

LRPM2 SUBMODELS AND STATUS OF DOCUMENTATION

Programming Designation	Purpose	Instructions Available
DEMOG	Population Projections	Yes
ECSIM	Economic Simulation	Under revision
EDUC	Education	Yes
FMPLN	Family Planning	Yes
DEMWA	Demographic Weighting	Yes
MIGRAT	Migration	Yes
HEALTH	Health	Yes
HOUSE	Housing	Yes
BUDGET	Budget	Projected
COMIDA	Food	In preparation
MORTE	Age-specific Disease	In reparation
ENERGY	Energy	June 1976
TRANS	Transportation	June 1976

interval, be it one year or five years, as period rates in order that such rates can be distinguished from cohort rates. The definitions of demographic terms need to be tightened and the description of life table usage and fertility patterns broadened to reflect other than UN practice.

The thrust of these comments have been discussed with the Director, Joseph Quinn, who is well aware of the need for providing more adequate documentation. This is a priority item for the SEA Staff and is presently being worked on. The construct of the submodels (with one exception) is technically sound; the major shortcoming is in the undue brevity and lack of completeness in describing these models.

When the SEA Staff actually gets underway on writing the moethodological manuals, it is suggested that examples of usage or analysis be included. For example, the LRPM2 population projection model permits incorporation of international migration. LRPM2 reflects not only the age-sex distribution of the migrants, but allows the proportions within the distribution to be varied. The input manual gives an example of change in distribution to reflect young persons (ages 19-35) leaving a country and older persons of retirement age returning to the country.

This refinement in projection techniques presents an opportunity to demonstrate how its use can be related to operational policy implications. Methodology alone is not enough; one should describe the kind of analytical use that can be made of it to deal with policy issues.

An example of this sort comes to mind which reflects the kinds of policy analysis which could be derived from an application of LRPM. In a study by this writer of population trends in Jamaica, it was noted that a substantial drop in birth rates occurred in 1967 and 1968. This coincided with the inaguration of a "domestic" program permitting young Jamaican females to emigrate to the United States to work as household domestics. The program met with great response and long lines of potential migrants formed daily outside the U.S. Embassy. Meanwhile the government-sponsored family planning program was expanding rapidly and hopefully making some demographic impact. Analysis revealed, however, that the "otherwise" fertility of the young female emigrants when coupled with the secular decline in fertility rates was sufficient to explain virtually all of the difference in lowered birth rates. The policy implication was that

little, if any, of the decline in birth rates could be ascribed to the efforts of family planning programs at that time. In a different country situation, analysis might show that family planning efforts were the primary factors in explaining fertility decline.

There are a number of other types of data generated which reflect changes in size or rates of growth and can be tied to operational population policy. Examples of applied analysis such as the one cited could perhaps help sell the usefulness of demographic socio-economic models to program administrators and policy makers.

The instruction manuals on submodels for education, housing, health services, migration and demographic weighting need little additional comment. They are straightforward, conceptually similar to other existing models and are generally soundly constructed. The chief advantage of these submodels over most model systems is that they can be run separately rather than requiring all the model routines run together.

The demographic weighting (DEMWA) routine is somewhat different than the others in that it attempts to weight the population according to the category of services being utilized. Demand for health services, education, economic consumption and food usage varies according to age and sex. Various appraoches to weighting are suggested including standard weights for certain of these categories. The general absence of country-specific information on various kinds of consumption patterns means that these "standard" weightings are the most likely to be used. The explanation as to why or whether these "standard" weightings are judgmentally the best or most appropriate is not given. Lacking this explanation, the user may feel the use of these suggested weightings questionable.

Standard economic consumer weights have been programmed into the DEMWA model for age groupings as follows: 0-4, 0.75; 5-9, 0.75; 10-14, 0.75; 15-19, 1.00; 20-64, 1.00; over 64, 0.50. Many other studies have employed other weightings with values of 0.35, 0.50 and 0.75 being among the most frequently used for the first three age groupings. The DEMWA weightings would therefore appear to be greater than other equivalent weighting schemes. It is not suggested here that the DEMWA "standard weights" are incorrect. Considerations such as per capita income, proportion of demand resulting from food requirements, inclusion or

exclusion of public consumption demands such as education, all enter into the picture. But a model specifically serving the function of providing weighting procedures must include a good deal more explanation about the justification for selecting certain values if it is not to become a myster routine.

Submodels for education, housing, health services (and later food, energy and transportation) are all important for showing the effects of population growth on these sectors. An argument could be made, however, that the implications of these submodels affect several other areas of concern to AID and that other technical offices should be aware of the results coming out of studies employing LRPM and the design of the model producing them.

The one submodel dealing directly with family planning programs (FMPLN) is not satisfactory. Relating demographic changes to family planning program efforts is considerably more complicated than is normally supposed; there are a host of factors which makes estimation of demands for family planning services very difficult. Even those claiming some background in demography seldom are familiar with the special techniques for analyzing family planning program data. SEA Staff has made a real attempt to build a comprehensive family planning service model, but there are several problems, conceptual and otherwise, which render its usefulness doubtful at this time.

The first problem is definitions. New clients are defined as "the number of new women entering the program at the beginning of each time interval." The interval, of course, may vary in different programs; some may enter new clients monthly, others on a quarterly basis. Provisions for differences in reporting times can be accommodated. More basic though is what is the definition of a client in a given program. Is someone who comes in for information to be counted? Is it someone who has accepted a method and then leaves the clinic, or must some evidence of initial use be known? To what extent are revisits confused with new acceptors? How are changes in method handled? Is a new client one who is new to a particular program or one who newly accepts family planning?

Other terms employed in the model are confusing. What is the "immediate continuation factor"? It is defined as

"a factor which controls immediate drop-out rates for the clients"? "Immediate" and "continuation" normally are contradictory terms. How can an immediate drop-out ever be a client? Is this a measure of persons to whom family planning was explained and then decided against becoming acceptors, or is this a measure of acceptors who dropped out within a short period of time, perhaps the first month?

In the section dealing with the "program continuation factor" no indication is given as to how this factor is modified according to the contraceptive mix. In computing service rates it is not clear whether certain measures are being assessed against active clients or total clients within a given period.

Another concept incorporated in the model is the "contraceptive effectiveness factor". The explanation given is that "this factor reflects how effective the method is in averting births. For example, if a method is know to have a five percent failure rate, then the effectiveness factor is given as .95". Although not stated explicitly, one assumes this refers to the intrinsic effectiveness of the contraceptive; what is usually termed "clinic" or "clinical" effectiveness.

The model, however, then introduces something termed "contraceptive effectiveness factor modification". This is to "allow the user to incorporate age related differences in effectiveness." The term "general effectiveness" as used in the FMPLN model is apparently some measure of contraceptive effectiveness modified by use-effectiveness. In the example given, the "general effectiveness" of pills for women age 15-19 is .95 while for all women it is .97. A multiplier of .979 is derived by dividing .95 by .97. The purpose of this multiplier is not clear. The statement infers that "general effectiveness" of the age 15-19 female group is .979 of the "general effectiveness" of all fertile women (.97). Multiplying this factor times the "general effectiveness" rate for women (.979 x .97) gives a result of .95 which is the "general effectiveness" rate for age 15-19 females already given.

The term "contraceptive effectiveness factor modification" reflects a confusion of concepts. The clinical or "contraceptive effectiveness" of pills is the same for all persons, so this should not be modified for age. On the other hand, use-effectiveness does vary by age and elapsed time. This, however, reflects differences in client behavior over time and does not directly refer to the

clinical effectiveness of the contraceptive. If use effectiveness is to be introduced into the model then the time period(s) by method should be specified. This becomes complicated in that for planning purposes it is more useful to measure continuation rates by overall program rather than by contraceptive method. Program continuation rates are not the same as contraceptive continuation rates, and the determination of the uses of the data output must be decided prior to adopting the concepts to be employed.

The criticisms of the family planning submodel may seem somewhat severe. Let this be balanced by the fact that the FMPLN attempts to incorporate more program considerations than probably any other model at this time. (This includes the Bogue models as well.) SEA Staff, for example, has included a special subroutine for computing births averted by induced abortion. Concepts such as expected length of the anovulatory period following an abortion or still birth, and even the expected length of gestation period before a scheduled induced abortion, are included. The model also handles the factor of overlap; i.e., the number of women who would be practicing some method of contraception even if the program were not operating.

The family planning simulation model has a number of features to recommend it. There is a need, however, to clarify some of the concepts and to confer more directly with AID on the kinds of uses such a model is to provide. Any model will be constrained by the reporting systems utilized and by the availability of certain kinds of data. This is an area where collaboration with AID by someone knowledgeable in clinic reporting methods and analysis of family planning statistics can perhaps finally derive a more fully adequate family planning model. More adaptation to fit local conditions will be needed than for the other submodels. The task of developing a good construct is time consuming and difficult. Lack of adequate statistical reporting may dictate the use of a more simple model, except where more sophisticated and reliable reporting systems have been employed.

A few overall comments about LRPM2 may now be in order. The coverage of the submodels are comprehensive and, with the exceptions of FMPLN, technically sound. LRPM2 is extremely flexible -- it can use virtually any type of input. The input can be readily changed and results are less affected by the built-in structure of the model than is the

case for GE-TEMPO because more parameters are exogenously chosen. The LRPM2 can readily move its statistical base back over time to replicate historical data and thereby provides an additional analytical tool. All-in-all, LRPM2 produces a wider range of social and economic projections of good quality than the other model systems constructed for AID.

B. LRPM3

The progress report of SEA Staff in November 1975 has this to say about LRPM3:

> "LRPM3 differs significantly from LRPM2 in that it keeps track of the educational level of people throughout all its submodels such as employment and income distribution. This makes it useful for studies of human capital, migration, changes in class structure and the causes of income in equality. We have continued some of the work on the LRPM3 and at the moment have a demographic submodel, a combined labor force/education submodel, an income distribution submodel, and an economic submodel. All of these need more work, careful verification of their program routines, and substantially revised input and output specifications so that they will be easier to format and can be run together. Social service sectors would have to be added later."

LRPM3 can also reflect yearly changes in fertility and mortality and can produce other yearly demographic data by use of Sprague multipliers. Urban and rural populations can be projected separately and allowance made for internal migration. It offers an advance over LRPM2 by being able to track people by their age and education level. LRPM3 also keeps track of stocks (ex. high school graduates) and offers more variations of vital rate parameters. Studies of income distribution can be done by LRPM3 which adds still another analytical dimension.

It may be useful to briefly amplify some of the features of LRPM3 and how they can be used for demographic socio-economic analysis. Most studies using economitric models emphasize how the level of well-being, as measured by per capita income, can be raised more rapidly under conditions of reduced population growth. This is an important relationship and a cogent argument for investing in programs to reduce fertility rates. Most models (including LRPM2)

are not capable of reflecting how changes in per capita income are distributed within the population. Even those studies that do treat income distribution seldom reflect differences in income distribution of persons in the labor force to those not in the labor force, or by families to each other and to the population as a whole. Income distribution is also affected by the burden of dependency, as reflected in the large proportion of children in many LDC's. Per capita income is reduced in such cases. Children, however, consume less than adults and do not need the same proportionate share of per capita income. The question of adequacy of income distribution is therefore affected by the composition of the population.

LRPM3 is able to take such factors into account and gives a much better indication of the demographic implications on socio-economic factors (and vice-versa). One suggestion for future study would be to explore more thoroughly the changes in income distribution in various LDC's in which progress has been made in family planning programs. In a 1973 study (William Roch, Smaller Families through Social and Economic Progress, Overseas Development Council) the general thesis was advanced that acceptance of family planning was greater for countries in which the relative shares of national income were increasing for the bottom fifth or two-fifths of the population. This is an important finding and if, by use of LRPM3, income distribution can be analyzed by labor force status, urban and rural population, and education level, some very important applications to population policy may be developed.

Another feature of the LRPM3 which is useful for population policy analysis is its ability to keep track of people by educational level throughout all of its submodels. This allows analysis to be made of employment or unemployment by educational level, or the relation of changes in income distribution to educational level. LRPM3 also measures education stocks such as primary, secondary, and college graduates which is very useful for manpower planning. (Other models simply measure the number enrolled at various age or grade levels for given years.)

A final feature of the LRPM3 is that both mortality and fertility rates can be changed on a yearly basis, rather than by five-year calendar periods. This makes for a smoother and more gradual change in rates and allows actual yearly data to be inputted if available. The impact of family planning programs can be incorporated into the planning process more rapidly and updating of the demographic

base and values of parameters made easier.

Manuals on LRPM3 are not yet ready, but there are indications of interest and demand from some developing countries for use of this model. There is little doubt that LRPM3 is a useful model and that its development represents a real advance in the state of the art.

C. LRPM4/PDM

This model was originally to be constructed under contract with Purdue University. It focusses on the interrelationships between the agricultural sectors and the rest of the economy. A description of the PDM model was prepared by the contractor entitled, The PDM: An Interactive Approach to Modeling Population Growth and Economic Development -- An Overview. The LRPM4/PDM is a sophisticated and complicated model which requires a great amount of time to prepare data in new formats. Single-age survival and birth rates are employed and are determined by location (urban, rural, non-agricultural and agricultural sectors) and education level. It uses a commercial linear programming package from IBM and uses demographic, labor force and education submodels adopted from LRPM3 routines. (The PDM model was renamed LRPM4/PDM in order to show the Census contribution.) Presently, the program is being adapted to use more available statistics rather than relying on a linear programming matrix.

Purdue University experienced a great deal of difficulty in completing their work on the model and they were well over a year behind in finishing. The program was written in non-standard computer language and could only be used at the particular CDC computer at Purdue. The SEA Staff has had to extensively rewrite the program to permit usage on other computers and the large program was broken into about forty parts. The LRPM4/PDM program now runs and some countries have indicated interest in applying it.

D. Other Developments

SEA Staff has done considerable exploration on the use of table formating. A routine has been developed which will allow an analyst to store several LRPM runs on a disc and create any table desired from this data. It will be possible to call up any combinations or arrangements of LRPM output from any combination of submodels or different runs of the same model as may be desired. This is a very powerful analytic tool not previously available on any other AID-funded contracts in this area.

SEA Staff has also done considerable work on utilizing an Integrated Planning Package (from the National Institutes of Health) built on top of the CalComp (University of California computer) package. In conjunction with a CalComp printer, it is possible to obtain line graphs with smooth lines. The improvement in graphing routines will materially assist in the presentation and interpretation of the results which are obtained.

Two very excellent studies on international migration and world food grain supplies are in the process of final typing. This notwithstanding, it is strongly suggested that suggestions for any further studies or country analysis papers be discussed with and made subject to approval of the Population Policy Division of AID.

In sum, the comprehensiveness of all the LRPM models in analyzing the interrelationships between demographic and socio-economic variables is exceptionally good. The adequacy of documentation can only be rated fair. Much work has been done and hopefully all manuals can be completed in the next six months.

3. APPLICABILITY OF MODELS TO AVAILABLE LDC HARDWARE. MEASUREMENT: CORE REQUIREMENTS AND HARDWARE SUPPORT REQUIREMENTS (PERIPHERAL HARDWARE).

The LRPM series of models offer great flexibility and can be operated on virtually all types and capacities of computers. At present LRPM installations have included IBM, ICL, NCR, CDC, and FUJITSU computers. A statement of computer capacity has been furnished by SEA Staff:

> "The LRPM models are segmented into submodels that can be run separately and can at least in some versions be run on machines as small as an IBM 360-40 without overlays. With overlays LRPM2 can be run on 30K core and LRPM3 on 60K core. Depending on the size of the linear programming matrix, LRPM4/PDM needs from 150K to 300K".

4. COMPATIBILITY OF MODEL REQUIREMENTS WITH LOCAL TECHNICAL CAPACITIES AND AVAILABILITY OF INPUT DATA. MEASUREMENT: FORM OF DATA REQUIRED AND GENERAL AVAILABILITY, SKILL REQUIREMENTS OF USERS.

Neither of these considerations should cause any particular problem. A knowledge of FORTRAN would be needed to modify the LRPM programs. Any social scientist or person experienced in using quantitative data can use LRPM2 or LRPM3 without any knowledge of computer languages. The data provided by

the economist or sociologist can be formatted by any semi-professional or computer technician who should also be able to call or run any of the routines. The LRPM4/PDM cannot be done locally without training and assistance from SEA Staff, but application of this model would be limited to countries whose planning is advanced and able to use more sophisticated techniques.

In dealing with the availability of suitable input data for whatever level of LRPM, subroutines have been developed for use of incomplete data. A description of its application was furnished with regards to population projections for Sahelian countries:

> "To avoid using U.N. stable population profiles for 1975 in 14 projections of Sahelian countries where mortality had dropped sharply for fifty years, we started with an assumed stable population around the year 1920 and ran the model forward to 1975 using demographers' estimates of the time paths of mortality and natality and then adjusted the 1975 profiles by sex and age to the estimated total population. Labor force estimates were rebenchmarked for a backwards projected population using a good 1970 census and 1960 and 1950 participation rates with corrected age group numbers for these years. Annual immigration age-sex profiles for an African country were estimated by simulating an annual stream that produced a profile that matched the census totals of all who had arrived over their life-times." (Joseph E. Quinn, The Use of the LRPM Models in Making Population Projections for Development Planning. September 1975.)

The ability of LRPM to use incomplete data and reconstruct age structure is an exceptionally important feature given the lack of deguate data for most LDC's.

In general, the level of complexity of LRPM can be fitted to the level of local technical capacities and availability of input data. The fact, however, that LRPM can be utilized with less than complete data makes its application wider than would otherwise be the case.

5. UTILIZATION OF MODELS IN LDC'S. MEASUREMENT: NUMBER/TYPES OF HOST COUNTRY ORGANIZATIONS UTILIZING THE MODELS, NATURE/EXTENT OF USE OF INFORMATION GENERATED BY MODELS; EXTENT OF COUNTRY SUPPORT AND HOST COUNTRY SUPPORT AND HOST COUNTRY ASSUMPTION OF ACTIVITY.

Part II of the SEA Status Report of November 11, 1975 indicates the status of involvement of SEA Staff with countries and organizations as follows: 12 countries asking for assistance in the installation of LRPM systems; 6 countries indicating that they will probably request assistance; 7 countries expressing some interest in LRPM; and 7 international and other organizations expressing interest in undertaking joint work with the SEA Staff. (See Table 2.)

The degree of involvement varies considerably among countries. Several subroutines of LRPM2 are in use in Hong Kong and in November, 1975, Nicaragua has begun to install the LRPM2. Earlier the LRPM1 was used in Thailand and the USAID Mission has approved a seminar on LRPM2. Various runs have been prepared for several countries: Pakistan, Yemen, Turkey, with 14 country proviles prepared for Sahelian Africa. (These are being redone with more extensive analysis at the present time.)

Many contacts are the results of conferences on planning development and through ESCAP. Egypt has invited the SEA Staff to participate in the Arab League Conference on Planning Models, to be held in April 1976, and to install LRPM2 in Egypt at that time. Egypt's primary interest is to later install the sophisticated LRPM4/PDM model which parallels requests for this model from Korea and Iran. Iran is sufficiently interested to pay SEA Staff expenses.

There has also been increased cooperation with other agencies in the interantional field. Work has been much better coordinated with other complementary efforts and recently a joint paper was preparcd with GE-TEMPO which was presented at an FAO conference on agriculture planning and population in Tangier.

It is still too early to assess the extent to which information generated by the models have been used in LDC's. There certainly is clear evidence of support and interest by a considerable number of countries to the extent that the SEA Staff may be hard pressed to meet all requests.

6. APPROPRIATENESS OF TRAINING OF LDC TECHNICIANS. MEASUREMENT: NUMBERS TRAINED AND ORGANIZATIONAL AFFILIATION; CAPABILITY OF THE TRAINED TO ADOPT MODELS TO LOCAL USE, SUBSEQUENT ADOPTION OF MODEL USE IN COUNTRY OF TRAINEE.

Training in the use of demographic socio-economic models is intended to be done by seminars held in LDC's, however,

Table 2

STATUS OF COUNTRY CONTACTS

A. Countries requesting assistance in installation of LRPM systems.

B. Countries indicating that they will probably request assistance.

C. Countries indicating some interest in LRPM.

D. Organizations expressing interest in joint work with SEA Staff.

(A)	(B)	(C)	(D)
Pakistan	Indonesia	India	ILO
Philippines	Bangladesh	Nigeria	FAO
Thailand	Brazil	Burma	UNESCO
Yemen Arab Republic	Mexico	Afghanistan	GE-TEMPO
Egypt	Sri Lanka	Tanzania	ESCAP
Turkey	Jordan	Colombia	Howard University (Africare)
Iran		Peru	
South Korea			Others
Hong Kong*			
Taiwan			
Nicaragua*			
ESCAP (UN)			

*Installed

none have been held so far. Individual participants from Pakistan, Mexico, Yemen and Sri Lanka have received instruction on the use of LRPM while here in the States. If the LRPM series receives wide acceptance, it will be possible that some of those knowledgeable in LRPM usage and analysis, as for example ESCAP staff, can serve as regional resources in training and providing technical assistance to others.

7. POTENTIALS OF THE PROJECT TO MEET INCREASED LDC DEMANDS FOR MODEL BASED PLANNING AND FOR AID'S NEEDS IN DEVELOPMENT PLANNING. MEASUREMENT: PRESENT STAFF SUFFICIENT AND QUALIFIED TO PROVIDE CONTINUING FIELD SUPPORT NEEDS FOR EXPANDING IMPLEMENTATION AND FOR ANALYSIS OF OUTPUTS TO PROVIDE AID WITH NECESSARY SUPPORT FOR AGENCY PROGRAMMING NEEDS.

The present SEA Staff, in addition to Joseph Quinn, Director, includes Roger Bove, Economist; Sally Finley, Regional and Social Planner; Betsy Ireland, Programmer; Lin Liau, Statistician; and Dolores Adams, Secretary. The adequacy of this staff to meet future demands depends on several factors.

On the plus side is the fact that considerably less work on model development and refinement is needed. The level of model sophistication is sufficient for the SEA Staff to have concluded, "We have reached the point where installations and applications of the LRPM models in the developing countries should be a principal activity of the Staff." Plans for developing still more sophisticated models (LRPM4 and LRPM5) have been abandoned. These are eminently sensible decisions and should free up SEA Staff time for working with LDc's on direct utilization of the LRPM.

Balanced against this is the need to make long-term commitments in working with LDC's. The amount of technical assistance needed is relative to the level of model sophistication to be utilized. LRPM2 can normally get underway with one man-month of assistance. LRPM3 or PDM/LRPM4 may require 2-3 months of SEA manpower because these models require additional data, different formating, and higher levels of technical knowledge on the part of LDC officials. Most model applications should involve periodic follow-up and technical review and assistance.

SEA Staff is probably adequate to meet demands in the next six months. If demand increases for installation of the more sophisticated LRPM models, additional staff

will be needed. Here is an instance where some of the members of GE-TEMPO staff may wish to enter into a collaborative relationship.

More sophisticated model installations bring about more implications for other sectors such as health, agriculture, education, energy, and labor. It may be desirable at such time to broaden the population objectives and involve other divisions of AID. These other sectors may also be considered in accepting a fair share of the costs in meeting the needs of additional staff. In any event, future emphasis of SEA Staff should be on writing analyses of country applications. Simply preparing computer runs is not enough. Data must be interpreted; trends identified; causes and effects of probable consequences explained. Writing to date has been altogether too brief and lacking in analytical depth. (The paper by Malek Mohtadi and Sally Finley on world food grain supply and demand is the prime exception.) SEA Staff does have the ability to write lucidly and with good analytical focus. What remains is to do more of this and to bring the level of writing up to the very fine level of technical competence in model building.

The strength of SEA Staff has not and does not revolve around any one person. A great deal of credit should be given Joseph Quinn for his efforts to greatly improve the SEA Staff program. The other members of SEA Staff have also contributed substantially and are capable of carrying on work in their own right. With much of the developmental work now accomplished, SEA Staff can become more institutionalized; a desirable development.

II. OVERALL CONSIDERATIONS

Support should be continued for SEA Staff for the following reasons:

1. LRPM offers three levels of modeling sophistication which offers flexibility in determining which series can best fit the availability and reliability of data.

2. Submodels in each series represent the best state of the art in model construction. They can be run separately from the othe models in the series which again offers flexibility of operation.

3. Models are intended to be applied on-site and can be utilized by a wide variety of computers.

4. SEA Staff indicate a willingness to do "rough and ready" work; to go on site quickly; to involve local participation; to minimize their role in favor of host country personnel.

5. SEA Staff emphasis is on applied studies and the wish to concentrate on producing results which can be clearly demonstrated to be in line with AID objectives and goals.

6. Most of the technical development of model building and programing is accomplished. To now turn over the project of socio-economic analysis to any other group would be time consuming and costly. Understanding the various facets and technical considerations involved in building a series of demographic socio-economic models requires considerable time. LRPM, which offers three levels of analytic sophistication, clearly represents the best overall state of the art in program design and construction. It would be regretable to loose the expertise of SEA Staff only to have to "reinvent the wheel" at a later date.

One final consideration, which applies not only to SEA Staff but to any other projects using the demographic -- socio-economic approach, is that such projects are frequently acceptable to LDC's where the more direct approach of fertility reduction and family planning is not acceptable. Getting countries to install a mechanism which can systematically assess the implications of population growth forms a rationale and underpinning which is important for the acceptance of fertility reduction programs. The use of LRPM allows an LDC to discover for itself the importance of adopting population policies which can assist in the development process. The planning route is essentially

neutral and much easier to accept by LDC's because it does not directly proclaim adoption of an ideology which is not endogenously based. The kind of assistance offered by SEA Staff represents another approach in dealing with the population problem.

III. SUMMARY OF RECOMMENDATIONS

A. Concentrate on installing LRPM models on-site in LDC's.

1. Assess level of model sophistication to level of development and intended purposes.

2. Finish manuals for submodels, especially methodological manuals.

3. Revise submodel on family planning.

4. Prepare expanded analyses on country applications.

5. Participate more fully with GE-TEMPO staff.

B. Hold seminars in LDC's for instruction on usage and analysis of LRPM series.

1. Identify participants in States for other related t training for additional instruction in LRPM.

2. Help train qualified personnel who can serve as regional resources.

C. Work more closely with AID in determining priorities in applications.

1. Suggestions for further studies and applications be discussed with and made subject to approval of the Population Policy Division of AID

2. Have further explorations with AID, including regional officers, on suitable uses.

3. Prepare additional materials for internal planning and policy purposes.