September 15, 1986

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A H A N D B O O K

TO GUIDE THE MEASUREMENT AND MONITORING OF PROJECT EFFECTIVENESS AND IMPACT

Project: Geothermal Heat
Applications Demonstration
(Department of
Quezaltenango, Guatemala)

Prepared By:
SES Development Corporation
2060 N. 14th Street
Suite 113
Arlington, Virginia 22201
Contract Number DE-AC32-86AL33162

For:
U.S. Department of Energy
and the
Los Alamos National Laboratory
Los Alamos, New Mexico

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DE87 001991

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PREFACE: PURPOSE OF THE HANDBOOK

This handbook culminates the effort by SES Development Corporation to demonstrate the application of a tool for measuring and monitoring the impact of a development project in the Department of Quezaltenango, Guatemala. That project itself presently is a demonstration. It explores the technical feasibility and the commercial possibilities of direct geothermal heat applications to the processing of agricultural produce -- with the eventual purpose of expanding agricultural exports from Guatemala.

The SES demonstration is an exercise. It focuses on an early stage of the geothermal initiative and guides preparations for future impact measurement and monitoring of geothermal projects. Primarily, guidance is for projects in agricultural applications of geothermal heat -- and basically in Quezaltenango. But the exercise and the handbook are relevant in broad outline to other, industrial applications projects as well which may be based in other departments and have immediate impact across the whole country.

This handbook attempts to prepare geothermal energy planners in Guatemala for that juncture when geothermal projects can be managed by objectives. It promotes and facilitates thinking about defining specific objectives for projects that result from the demonstration at Zunil (in Quezaltenango Department); and it prompts preparations for obtaining baseline measurements and for making rational projections on the achievements of future projects.

It will be seen in this document that baseline measurement and projecting targets for achievement are central to the SES system for measuring and monitoring a project's effectiveness. Defining the important sectors of a project's

activities and identifying valid indicators of achievement in those sectors are the other critical features of the monitoring tool.

Using information from the geothermal demonstration at Zunil, this handbook attempts to guide planners to decisions on each of these topics as preparations are made for future geothermal projects designed with specific developmental objectives in view.

PART ONE: BACKGROUND

Development Corporation

CHAPTER I. INTRODUCTION TO AN IMPACT MEASUREMENT AND PROJECT MONITORING TOOL

A. The Measurement and Monitoring of Impact

The SES methodology for measuring project impact and effectiveness is concerned with locating the best objective data available to determine whether changes did occur in selected project measurement indicators and the degree to which the project attained its projected goals and objectives. An important feature of the SES impact assessment approach is to determine the degree to which baseline measures change as a consequence of some type of project intervention. Impact assessment not only requires baseline measures based on hard evidence, but a projection of anticipated results prior to actual project initiation. Laying a base for such determinations in geothermal projects in Guatemala is the major purpose of this document.

The measurement of a project's effectiveness in reaching its objectives, like the measurement of a basketball player's goal average and shooting percentage, provides in objective and quantified terms a realistic means of estimating whether or not the effort and resources involved in providing support proved to be justified. It is obvious that with both the project and the basketball player, many factors influence the measurements achieved. But in comparing projects and their strategies and players and their talents and styles, and with information on "norms" (or baselines) at hand as a backdrop to comparisons and expectations, objective measurement can be extremely useful both in monitoring development activities and managing a sports franchise.

Essentially, a project is an intervention into a cultural and physical environment which possesses many consequences that cannot be fully or accurately

predicted at the outset. Metaphorically, the measurement of impact is much like the measurement of the effects of a stone that is thrown upon the water. Where the stone strikes, there is a splash -- the short-run impact. This is followed by ripples that take place later and cover much more territory -- the long-run impact. Thus, impact exists in two stages, immediate and second-generation effects. But with a project that is designed with intended objectives, it is not enough simply to "drop the stone" and watch the splash and then the ripples wherever they may go.

Every project possesses an immediate impact by its mere initiation. The very process of its beginnings, the new personnel, facilities, equipment, coordination, activities, and funds produce the immediate consequences of something new, visible, and (probably) different. Once the project has become operational and even institutionalized, impact shifts from short-run to long-run effects. This takes place as the project coordinates efforts with other governmental, private, scientific, educational, etc., organizations. During this long-range phase the initial energies may dissipate, oscillate, or increase substantially over time. But at any phase, insofar as a project is not simply a venture into the unknown but, at least in part, an undertaking with planned objectives, thought must be given to how well objectives are achieved.

The measurement of project effectiveness thus involves a requirement to attempt to predict at the outset short- and long-run consequences of the particular project. This effort to predict the impact of a project prior to its initiation demands the following:

- Clarification and specification of goals and objectives of the project.
- Establishing what could be expected to occur had the project not been implemented as compared with what could be expected to occur with the new project.
- Minimizing ambiguity and uncertainty of the impact of the project through the use of objective and quantitative measurement methods wherever possible.

B. Essential Elements

The essential basis for impact measurement is to limit the element of error in distorting whether a particular development project exceeded or did not exceed its objectives. In this regard, the type of measurement utilized to assess project impact should provide the following.

1. Objectivity

Impact measurement should provide a method of reducing the importance of any type of subjective and/or personal factors (such as authority, criticism, self-aggrandizement, self-fulfilling prophecies) by focusing on such matters as:

- Whether or not changes occur.
- If changes do occur, the direction of the changes.
- How much change took place.
- Whether the changes are properly attributable to the policy, program, or the project itself, or to other external factors.

2. Comparability

Any method of impact measurement can only justify the expense and effort in its application if it assists the project initiators and managers in deciding whether one approach or method is better or worse than others and by providing insights into how a project might be improved over time. Thus, an effective method of assessing impact should be designed so as to permit comparisons between projects with similar objectives or levels of impact within a single project. This is consistent with the Agency for International Development's position that the "approaches, methods and techniques used in impact evaluations... must be adequate to detect change. In addition, they must be precise enough to yield information on the degree to which the changes are attributable to specific causes." (Design and Evaluation of AID-Assisted Projects, USAID, Training and Development Division, November 1980, p. 240.)

3. Standardization

Standardization is necessary to permit comparisons to be made between successive stages of a project or between projects. As projects usually involve different events in differing developing country cultural and societal contexts, it is usually necessary to provide some means of transformation so that comparisons between projects may be possible. This can be done by percentages, percentiles, and various types of distributions. Not to provide some standard, however, produces fragmented findings where project impact measures cannot be either compared or related to each other.

4. Specificity and Time Dimensions

The primary consideration in evaluating is to determine "Impact on what?" Hence, it is necessary to locate and define exactly what the project is expected to change or improve and in what time frame. This usually imposes a requirement to go beyond mere desires in a search for quantifiable evidence that is germane to basic objectives that impelled the project into existence. For example, if a project was established to improve the supply of water to farmers, then it would be necessary to define:

- How much water is needed by farmers at specific points in time (specifying the project objective).
- How much water has usually been available for farmers at these times (specifying baselines).

The objective should then be stated in a form that can be made into a measure or indicator. For example, if a project had been concerned with use of irrigation to increase the amount of water by 50 percent on a typical farm in a particular developing country, the indicator might be millimeters of water per hectare per month. In this case, it would also be necessary to consider the differences in water needed by month, because irrigation requirements would fluctuate by month and season.

In the present exercise, we will be looking for objectives that can be stated in terms of gaps or needs that might be filled through geothermal direct heat applications. If such needs can be discerned and baselines determined on the gaps' widening or narrowing without any new project intervention, then a rational basis for projecting achievements of a geothermal project will be at hand. As in the irrigation example above, the time dimension should also be

associated with the projections on how needs will be met.

5. Appropriate Indicator Selection

Measurement indicator selection must be specific to the project objective and take into account the following:

- The existence of whatever relevant objective data are available to be used to develop the baseline measure.
- An objective method of measurement, to be provided so that the indicator can be expressed numerically.
- Consistency of the indicator with what is being measured: water must be expressed in gallons or liters; three dimensional space should be expressed in cubic feet or meters, etc.
- Indicators should also define some time period such as a week, month, quarter, or year.

Thus, in the irrigation illustration an indicator measure could be expressed as: pesos per cubic meter per year; pesos per kilowatt per year; pesos per ton (of crops) per month. And in geothermal agricultural applications in Guatemala, one might propose quantity measures of crops (and their values in Quezales) processed per month, quarter, and year. In summary, the indicator should provide:

- A means of measurement that is specific and relevant for determining the achievement or non-achievement of project objectives.
- A means of determining the degree to which the project is meeting its interim objectives (milestones) over the project years (and their quarters).
- A means of producing feedback to project managers during and following project initiation.

C. Basic Features Summarized

The SES Impact Measurement Methodology attempts to measure objectively and quantitatively the extent to which a development project attains its objectives. It enables project managers to plot and maintain a record of achievements in numeric terms, keeping their attention focused on a few indicators that have been identified as significant marks of achievement. It requires:

- Objectives: Spelling out of a project's objectives (in numeric terms, insofar as possible).
- Baselines: Identification of baseline measurement values (including trends that can be discovered in, and projected from, a pre-project period).
- Projections: The projection of expected achievements (using the same units used in baselines).
- Periodic Measurement: Measurement and plotting at regular time intervals of a project's impact and achievements.
- Computation of Percentages of Achievement: Final expression of a project's achievements through time as a percentage of actual achievement compared to projected (or expected) achievement.

The picture that is presented to project planners and monitors by the system is shown in Figure 1, which also presents key terms that can be defined simply. In Figure 1, a project is assumed to possess impact to the extent that it achieves its goals as measured objectively and quantitatively. This impact is expressed as a percentage of achievement of projected target values.

The basic essential for impact measurement in this frame is to establish a final project objective or target that can be measured in the same units from some

Figure 1: IMPACT INDICATOR CHART

time period before the project starts (baseline), throughout the life of the project, and to its final completion. In Figure 1, the project's final objective is shown by Item #1 (Target Value Indicator, to be read on the chart from the left-hand scale) and Item #2 (Target Value in Percent, read on the right-hand scale). The measurement of impact involves determining the degree to which the Actual Achievement Values, shown by the double line, reached the Projected Target Value, shown by the dash-square line.

Acquisition of baseline data for years preceding the project permits the computation of an angle or "slope" for an extended baseline. This line is projected as a straight line for the project years and represents (in the model) what could be expected to occur on this indicator dimension without the project's intervention. The extended baseline provides a rationale for the projection of a project's achievements.

Baseline values are fundamental to project impact measurement. In Figure 1, the beginning of baseline computation is established as three years before the project started. The time at which the project starts is shown by the pyramid symbol. Note that the indicator value was 10 units when the baseline began (Item #3) and had reached 13 indicator units when the project was started (Item #4). The difference between the beginning baseline value (10 units) and the indicator value when the project began (13 units) reflects indicator gains that took place without the project, a gain of 30 percent in three years for a mean gain of 10 percent per year. This mean percentage change is used for the baseline projection. The Extended Baseline Value (unbroken line) represents gains assumed for the subsequent five years without the project's intervention --

a projection of a 10 percent increase per year reaching approximately 21 units after five years. In the example shown, the objective was set to achieve via project intervention an increase to an amount approximately double that which would have been reached after five years without the project.

In computing the Project Impact Value (PIV) for the illustration shown, we start with the Projected Target Value terminating at 41 indicator units (after starting at 13 units). Then we note that the Actual Achievement Value at the end of the double line was 37 indicator units at project completion. During the course of the project, the Actual Achievement Value is usually obtained on a periodic basis, by month or quarter. These "actuals" are then compared with "projecteds" to determine the degree in percent to which project objectives are achieved as the project progresses.

Figure 1 would produce as final impact value for the illustration (where AIV = Actual Indicator Value and PIV = Projected Indicator Value):

$$\text{Final Impact Value} = \frac{\text{AIV}}{\text{PIV}} = \frac{37}{41} = 90\%.$$

CHAPTER II. THE GUATEMALA GEOTHERMAL HEAT APPLICATIONS PROJECT

A. The Setting

The term "Zunil Demonstration" designates the project that is the subject of this demonstration of an impact measurement system. The Zunil Demonstration of geothermal heat applications in agriculture is based in a geothermal well site at the municipality of Zunil where a formerly unusable well has been capped for use and is able to generate 400 horsepower. This energy will be used to demonstrate the technical and commercial feasibility of dehydration of agricultural produce for commercial sale and export.

The town of Zunil is located in the Department of Quezaltenango, a region and administrative unit of some 2,000 square kilometers in the mountainous southwestern area of Guatemala. Average altitude of the town of Zunil is 2,077 meters while the average altitude of the largest municipality in the department, Quezaltenango City, is 2,333 meters. This major city is within 10-15 kilometers of Zunil. (See maps on the following pages.)

While the geothermal demonstration will concentrate its activities of crop dehydration within a few meters of the well site, produce will be drawn from a wide-ranging area and marketing processes may similarly reach far across the highlands agricultural economy of the Department of Quezaltenango. Therefore, a basic demographic and socioeconomic profile of the setting for the demonstration can be obtained from information on Zunil, Quezaltenango City, and the Department of Quezaltenango. Table 1 summarizes some important facts about the demonstration area as represented by these administrative units.

REPUBLICA DE GUATEMALA DIVISION ADMINISTRATIVA

DEPARTAMENTO DE QUEZALTENANGO

TABLE 1

Significant Facts About Selected
Administrative Units of the Demonstration Area

A. Basic Characteristics of the Population

	<u>Total Population</u>	<u>% Male</u>	<u>% Female</u>	<u>% Econ. Active*</u>	<u>% Indian</u>
Quezaltenango Dept.	366,949	49.5	50.5	27.9	60.6
Quezaltenango City	72,922	46.9	53.1	30.8	50.3
Zunil (Town)	7,009	50.1	49.9	31.6	91.7

*Economically Active = Employed in productive economic activity.

B. Housing Characteristics

	<u>Total Hous- ing Units</u>	<u>% Unoccupied</u>	<u>% With Different Types of Lighting</u>			
			<u>Elec.</u>	<u>Gas</u>	<u>Candles</u>	<u>Other</u>
Quezaltenango Dept.	72,249	11.4	32.9	50.7	15.9	4.0
Quezaltenango City	12,901	8.5	68.5	9.5	21.9	0.0
Zunil (Town)	1,441	7.8	20.3	32.9	46.7	0.1

C. Literacy of the Population

	<u>Numbers Literate</u>	<u>% of Total Population</u>
Quezaltenango Dept.	164,037	44.7
Quezaltenango City	47,361	64.9
Zunil (Town)	2,113	30.1

Standing out in the profile of the demonstration area are the following contrasts:

- The very high proportions of Indians and of non-literates in rural Zunil; the contrasting lower proportions of Indians and higher proportions of literate persons in nearby urban Quezaltenango.
- The low proportions of houses in Zunil lit by electricity and the high proportions there lit by candles; the contrasting high proportions of houses in Quezaltenango City lit by electricity and low proportions lit by candles.

The contrasts in the demonstration area profile suggest some of the social and economic distances to be bridged in a demonstration oriented toward drawing into participation the rural, largely Indian, producers of crops while relying upon more urban-based, formally educated private entrepreneurs to organize the flow of produce, and with the total demonstration orchestrated, and the geothermal energy supplied (and eventually metered and sold), by urban-based officials representing government.

B. Substance and Phases of the Project

The commercial processing center eventually developed at Zunil will perform freezing and canning, with cooking or drying operations also planned for this facility. Agricultural produce will be drawn from the Zunil surrounding area and across Quezaltenango Department. A major objective of this development, both the immediate local intervention (the "splash") and the ripples emanating from it, is to contribute to exports from Guatemala by assisting in the processing of export products.

The major organizations involved in the demonstration are MEM (the Guatemala Ministry of Mines), INDE (the Guatemala power utility), and LANL (the Los Alamos National Laboratory of the U.S. Department of Energy). LANL supplies funding through the U.S. Agency for International Development and gives technical assistance; INDE's basic role is to supply the energy while also addressing environmental problems; and MEM's role is to regulate. These principal organizations are looking to the private sector for commercial development after the demonstration has proven technical feasibility and while a rate structure is developed for selling the BTUs. The Guild for Exports of Non-Traditional Products will develop mechanisms for supplying produce from farmers -- both in the early demonstration phase and later as a part of commercial market processes. A committee of that Guild has begun working on initiation of this market-flow and market-transactions process.

The demonstration project is currently planned to continue until mid-1989. Thus, from mid-1986 when a definite decision was reached to base the geothermal applications project in an agricultural-processing demonstration at Zunil, three years will unfold to the point where a specially-funded "demonstration" ceases. However, technical feasibility of the geothermal processing of agricultural produce will be determined by spring of 1987, and while a socioeconomic feasibility study for a commercial processing center goes forward from that point, it is hoped that commercial feasibility will have been demonstrated well before the target date for a commercial freezing plant, to begin operations in mid-1988, has been reached.

Some key milestones in the months between mid-1986 and mid-1989 can be identified as follows:

Construct Temporary Technical Demonstration Facility	June-Sept. 1986
Operate Pilot Facility	Nov. '86-July 1987
Feasibility Study	Jan.1-Aug. 1987
Prepare For Freezer Plant Construction	Jan.-June 1988
Construct Freezer Plant/Prepare For Commercial Operations	July '88-May 1989
Operate Freezer Plant/Installing Other Processing Components	June '88-May 1989

While specific milestones have shifted (and continue to change), so that a most recent date for inaugurating pilot plant operations now is cited as mid-January 1987, in general the demonstration can be divided into three phases:

1. Construction and operation of a small pilot plant to mid-1987, with a decision on technical feasibility reached by spring 1987.
2. Feasibility study of a commercial plant beginning in early 1987; and construction of this plant (including preparations for manning and operations, supply of produce, rate structure for selling power) begun in mid-1987 and continuing to mid-1988.
3. Operation of the commercial freezer plant from mid-1988 to mid-1989 (with installing of other processing components occurring throughout this period).

It should be noted that dissemination of information about the demonstration and about geothermal applications will go on throughout all these phases.

C. Objectives

The basic objectives of the project can be listed briefly:

1. Bring about the use of new (indigenous but commercially unharnessed) sources of energy in Guatemala.

2. Promote the development of agro-industry.
3. Increase the level of employment in agro-industry.
4. Increase exports of agricultural products.

The broad and general goals of the project are to improve the standard of living of the population, particularly the Mayan Indians of the agricultural highlands; decrease dependence of Guatemala on foreign petroleum; and improve the country's balance of payments position both through decreasing the petroleum dependency and increasing exports of the abundant agricultural resources.

The demonstration begins with these basic objectives and broad goals in view. Hopefully, it will gather momentum and obtain direction for making actual contributions to these objectives and goals during the years that it explores and develops feasible procedures and relationships. By the time of its cessation as a demonstration it should be on the threshold for planned, purposeful and targeted actions that attempt to impact directly on developmental change toward these objectives and goals.

CHAPTER THREE. A FORMAT FOR MEASUREMENT TO ASSIST PROJECT PLANNING AND MANAGEMENT

A. Assumptions

A number of assumptions are made in this guidebook for applying an impact measurement and project monitoring tool to the Zunil agricultural-geothermal demonstration. It will become clear as these assumptions are digested that the application of this planning/management technology is basically presented as a preparatory step. The demonstration years at Zunil and in Quezaltenango Department will be considered years of preparation for monitoring and managing future, goal-directed agricultural-geothermal projects -- or subsequent phases of the Zunil project when, for example, further support and reinforcement of commercialization is planned and administered on a project basis.

The following assumptions are made in the guidance presented in PART TWO.

1. System Users

The INDE utility organization is addressed as the present and future user of the monitoring tool and its system for measuring project achievement of objectives. It is recommended that an office in that organization be designated an evaluation unit and serve as an informational arm of those responsible for geothermal applications projects. The information base (manual and computer) of this monitoring system should be established and maintained at INDE.

It is acknowledged that geothermal projects, now and in the future, will probably be "joint ventures" wherein responsibilities are shared among a number of Guatemalan as well as non-Guatemalan organizations. Therefore, it is recommended that the evaluation unit based at INDE:

- Create a coordinating committee through which representatives of other relevant involved organizations participate in preparations for measurement and accept responsibilities in agreed upon measurement processes. Currently this committee should include:
 - A designee of the Minister of MEM.
 - A designee of the Minister of Agriculture.
 - A representative of IANL.
- Establish liaison and working relationships with (and invite attendance at meetings by representatives of):
 - Secretaria General de Planificacion Economia (SEGEPLAN).
 - Gremial de Exportadores de Productos Notradicionales (a private sector guild).

2. Time and Space Dimensions

The following time periods are taken into account in the measurement/monitoring schema:

- Immediate Short Run (ISR): the 6 month period covering October 1, 1986 to March 31, 1987.
- Extended Short Run (ESR): the period from April 1, 1987 to mid-1989 (completing the total time frame of the demonstration).
- Long Run (LR): ostensibly the five years following the demonstration; but, allowing for a preparatory interval before targeted projects (and post-demonstration phases) are defined and set for impact measurement, this period will be considered the years 1989 through 1994.

The spatial limits of impact measurement are defined as the Department of Quezaltenango and subunits of administration within that Department. The feasibility of obtaining and maintaining data aggregated from selected municipalities will be explored during the demonstration years. Thus the feasibility of identifying and utilizing subregions of the Department for impact measurement will be examined.

3. Project Sectors

The sectors identified as defining important subareas of project activity and where distinctive types of impact can be measured are:

- Dissemination of Information
- Employment
- Agricultural Activities
- Markets

a. Dissemination of Information. This refers to communications about geothermal applications, specifically as they relate to agriculture. Early in the short run, information dissemination may concentrate on publicizing the demonstration itself and its purposes and safeguards as cooperation and acceptance are sought. But as activities even in the Extended Short Run reflect the momentum of commercialization, the shift will be toward communication about opportunities, not only at the Zunil commercial site but in spinoffs and new initiatives at other locations.

b. Employment. This sector is identified because of extreme interest in how geothermal developments will directly create jobs and have a multiplier effect in job creation in supportive, related areas of the economy. Specific plans for job creation during the demonstration period will be accounted for, along with the type and quality of employment and characteristics of employees. Preparations will be made for detecting employment impact in terms compatible with existing and evolving employment data recording systems; and discovery and application of appropriate multiplier formulae will also be on the agenda during the demonstration period.

c. Agricultural Activities. The focus of impact measurement will remain on agriculture-geothermal applications; thus changes in agricultural activities will be a prime consideration. Amounts of crops processed through geothermal facilities, and amounts and values of these crops produced, will be a natural focus of interest and measurement. Preparations to detect crop diversification will be a part of the demonstration exercise. Another challenge of the demonstration period is preparing to detect and measure technological changes associated with crop growing which anticipates geothermal processing and exporting.

d. Markets. Less immediately and directly affected by project activities than the other sectors identified, market transactions of many kinds should nevertheless be influenced by geothermal developments. And the market sector is a vital focus in light of basic development objectives of the geothermal initiative in Guatemala. In the demonstration phase, the end-in-view for long-run measurement is changes in agricultural exports. But other transactions of sales,

investment, and consumption can be identified and measured in local, department-wide, and national markets on the road to measuring international exports and their contributions to an improved balance-of-trade situation for Guatemala.

4. Types of Indicators

The SES Impact Measurement and Monitoring System calls for the identification and use of a small number of good indicators for each sector of activity and impact. In the present exercise, a few specific indicators are proposed for trial use while others are cited for possible test and experimentation during the demonstration phase. A backdrop to the decisions and guidelines presented in PART TWO reveals some of the many possibilities that influence the search for appropriate indicators. Note that the SES System calls for quantification within time periods; so each indicator cited below assumes that measurement refers to an amount per month, quarter, year etc.

a. Dissemination Indicators. Different groups targeted for communication tend to require different types or methods of dissemination. Literate persons in the general public will read news items and flyers; less literate persons may have to be escorted on visits to see facilities, and special interest groups may also benefit from organized field trips; bankers and investment decision makers want to see printed reports and weigh their findings. Thus general categories of indicators and possible units of quantification include the following.

- Person hours of formal training
- Numbers of formal training courses (and their attendance)
- Numbers of person-visitations to site
- Numbers of field trips (and their attendance)
- Numbers of conferences and workshops (and their attendance)
- Numbers of flyers distributed
- Numbers of reports distributed
- Numbers of articles and their distribution/circulation
- Numbers of column inches devoted to agricultural-geothermal in newspapers

b. Employment Indicators. Direct job creation appears more readily quantifiable while indirect effects on employment in related fields requires experience that can lead to the development of multiplier formulae. Total job figures need to be broken down, if possible, to measure how specific unemployment gaps and disparities (among subgroups) are being narrowed, widened, or unaffected. Categories and units to be considered include:

- Numbers of persons employed at facilities
 - Permanent/Seasonal
 - Skilled/Unskilled
 - Male/Female
 - Special Target Groups (Mayan Indians)
- Paid person-hours at facilities
- Payrolls at facilities in monetary value
- Employment by salary levels
- Unemployment rates (broken down by subgroups)

Related employment areas where multiplier effects should be sought include:

- Transportation
- Warehousing
- Other services

c. Agricultural Activities Indicators. These indicators should look initially toward both the fields and the processing facility or facilities, but increasingly should be oriented to what is happening on the land in the agricultural highlands of Quezaltenango. Possibilities include:

- Numbers of tons (or bushels) of crops processed at facilities (and types of crops processed)
- Numbers of hectares planted/harvested (and types of crops)
- Tons of fertilizer used/supplied
- Tons of seed used/supplied
- Hectares cultivated via various methods:
 - Hectares not cultivated
 - Hectares lying fallow (but prepared/preserved for cultivation)
 - Hectares terraced
 - Hectares under irrigation
 - Hectares cultivated by machinery

d. Markets Indicators. The link here needs to be maintained initially between market transactions and their association with geothermal-processed agricultural produce. But once categories of "frozen" or "dehydrated" produce are recorded in established record systems, it becomes less important to make this direct linkage -- since the geothermal "splash" may have led to ripples that

foster other processing methods which also contribute to new markets and, especially, to expanding agricultural exports. To be considered in indicator categories and units are:

- Tons of geothermal-processed produce sold:
 - In local area
 - In the department
 - In the nation
 - For international export
- Money value of these sales
- Money invested in geothermal-processed produce:
 - For domestic consumption
 - For export
- Tons of all processed agricultural produce sold for international export
- Money value of these agricultural exports
- Balance-of-trade in monetary value for Guatemala

Some account may need to be taken of the specific crops reflected in these sales and investments and their monetary value -- since crop diversification is an objective of AID agricultural projects in the highlands. If a particular "money crop" becomes a prime candidate for processing and export during the demonstration period, then projections for long-run achievements of project objectives may be stated in terms of this crop -- or several such priority candidate crops.

5. Baselines and Projections

It is the need for baselines that makes it mandatory for the present demonstration to be an exploratory exercise -- one that is heavily weighted

toward guiding the development of baselines for future project phases. For baseline data provide trend lines that make possible the projection of extended baseline values. They also provide backdrop and some rationale for projecting final target values for indicators (thereby permitting the plotting of intermediate target values as well).

The examination of the measurement problem which has led to this guidebook found very little in the way of baselines producing trend lines useful for immediate and valid projections on indicators for the Zunil Demonstration. The guidance of PART TWO basically attempts to bring the project to a juncture, in each sector, where projected baseline values and projected target values can be set down for a definite period of future quarters and years of this project and immediate offspring projects.

B. Introduction to Basic Forms

In the section which follows, the guidance for measurement in each sector is built around six forms and a single chart (although for this exercise not all the forms are used, or considered appropriate, in all sectors). These elements can be described briefly.

1. Form 1. Sector Overview: Definitions

This form sets on record basic definitions for the sector and for the indicators being used in impact measurement. It is organized for up to three indicators; and for the present exercise those shown on Form 1 are proposed for immediate test use in measurement (even though good baselines are not available).

Spaces for target projection entries may not be filled in -- especially in the case of Long-Run (LR) projections. But this recording form assumes that final target values need to be placed on record when valid achievement values can be projected.

2. Form 2. Basic Sector/Indicator Parameters and Requirements

This form too is a part of the established and maintained record on a sector and its measurement indicators. In a project (or project phase) when impact measurement has been definitely set, against clearly defined objectives (that will not be changed during the measurement time period), this record is extremely important in specifying the following established values and procedures regarding indicators:

- Data Collection Method
- Data Collection Source
- Responsible Organization and Official
- Project Begin Value of Indicator
- Projected End Baseline Value
- Projected End Target Value

For the exercise, entries on this form are considered to be in a dynamic state. Space for comments (at the bottom) reflect the nature and status of entries that have been made.

3. Form 3. Exploratory Indicator Register: Immediate Short Run

This form is designed for exploratory use with regard to a single indicator (thus one such form is needed for each indicator being examined in a given

sector). This particular form is organized for the Immediate Short Run. It is assumed that for each time period, succinct summary notations will be placed on record regarding baseline values (examined and considered) and target achievement values (considered for this indicator). This cumulative record should contribute to learning about the appropriateness of an indicator and to solving the problem of discovering or preparing to develop baselines.

4. Form 4. Exploratory Indicator Register: Extended Short Run

This form is the same, and has the same purpose, as Form 3 but carries the test examination of an indicator and its baseline into the Extended Short Run. It is assumed that this exploration on a given indicator will be curtailed before all quarters of the ESR have been completed. For indicators then accepted as valid and appropriate, recording will shift to Form 5.

5. Form 5. Indicator Achievement Register: Extended Short Run

If an appropriate baseline for an indicator has been found in existing records for a prior period, the recordings for Form 5 will contain projected baseline values (based on a trend line) for all the then-remaining quarters of the ESR. Recall from Chapter I that when the measurement system is set in place, projected baseline values are set down for all the future periods up to the end of the project; and after a final target value is established, projected target values are also set down for all the future periods of the project. Form 5 permits this to be done on a trial basis (in the ESR period) when a baseline is discovered and target values are also then set on a trial basis.

Form 5 will also be used (and will probably more frequently be used) to record data on an indicator for quarters in the ESR in order to establish a baseline trend that can be used finally for LR projections on the indicator. When an indicator is accepted as valid and appropriate but no baseline is found in existing records of past time periods, Form 5 permits the recording of indicator values preparatory to obtaining a baseline trend for extended baseline projections in the LR. These recordings are made in the first column ("Actual or Projected Baseline Values"). While these recordings are being made, practice Target Values can also be projected (and, of course, Actual Achievement Values will be the same as the entries in column one).

In both uses of this form, the Impact Values should be computed for the right-hand column to provide information relevant to feasible targeting of achievements in the LR.

6. Form 6. Indicator Achievement Register: Long Run

The entire exercise prepares the way for the completion of this form bringing a demonstration project to a juncture where goal-oriented and targeted actions are specified. On this form, projections for the complete LR period are made for: Projected Baseline Values (computed from trends in preceding periods); Projected Target Values (filled in for each quarter after a final target value is set). The form then provides for ongoing, periodic recording of Actual Achievement Values in the LR quarters and for the computation of Impact Values at each of these milestones.

A Form 6 is presented for each sector (illustrated for presently prime-candidate indicators). However, the remaining spaces for entries remain blank as this demonstration exercise prepares the way for filling out Form 6.

7. Chart 1. Impact Plotting For Indicators

This chart is a shell of the chart presented in Chapter I and used there to define basic elements of the SES System. It is a field of potentials prepared for each indicator in a sector and ready, once necessary data are at hand, to plot:

- Baseline Begin Value line
- Extended Baseline Value line
- Actual Achievement Value line
- Projected Target Value line

The shell requires that an appropriate scale be inserted, specific to a given indicator and its units of measurement, on the left-hand vertical axis.

In the present exercise, some entries for the Extended Short Run (base-line period) are shown for a prime candidate indicator for some sectors.

PART TWO: GUIDANCE FOR MEASURING AND
MONITORING PROJECT IMPACT

Development Corporation

CHAPTER IV. THE DISSEMINATION SECTOR

A. Status of the Sector and Its Indicators

1. Rationale of the Sector Focus

The Dissemination Sector should be considered as beginning tabula rasa -- a clean slate. In the strictest sense, measurement of actions in this sector cannot truly be called "impact" measures, at least not initially; for what will be measured is how much of a particular type of activity has been undertaken by persons directly connected with the geothermal project and its publicizing and development. This is not actually measuring impact, of either the influence of the project on the content of existing media or the effects of information dissemination on the behavior of receivers of the messages. Eventually, however, it may be possible to shift measurement toward procedures like content analyses of print media to detect and quantify frequencies of appearance there of the agriculture-geothermal theme and analyses of exposures of information "spots" (regarding agriculture-geothermal) on radio and TV.

In the United States, purchased services can be obtained for both of these types of measures of domestic exposure and coverage of, for example, a drug abuse or alcohol abuse campaign. But even in the United States, disseminators of information about campaigns have to resort to special studies to get at behavioral consequences of message reception, and most limit dissemination evaluation to how widely a message is distributed and "picked up" and how prominent a theme appears in various media.

Setting aside the issue of measuring the behavioral effects of dissemination, it does appear feasible to give strong consideration to content analyses

and exposure analyses. This too would require a special data-gathering intervention by project personnel or persons contracted by them, since no external and established record system or service can be tapped in Guatemala to discover baselines and milestone measures on the appearance in media of the agriculture-geothermal theme. Nevertheless, it is recommended that, in preparations for the Long Run, project planners/monitors consider having thematic content analyses performed periodically to detect change in the appearance of this theme in the media. This would refine impact measurement in the Dissemination Sector so that, beyond counting activities and items specifically initiated by project personnel, information is obtained on message exposure and theme proliferation resulting from these activities.

It should be recognized too that even in limiting impact measures for Dissemination to units derived from specific actions of project personnel, it is possible to look for these units in the actions of other, non-project personnel and organizations. Thus it should be possible to detect the multiplication of dissemination carrying the agriculture-geothermal message. However, this will require that records be maintained, or made available to project monitors, on these types of dissemination activities generated by other organizations.

2. Proposed Indicators

Considering the many types of measures suggested in PART ONE for the Dissemination Sector, synthesis is necessary. Units are needed that cut across numerous dissemination methods. Two indicators are proposed:

Indicator #1: AG* Individual Exposure Hours/Month & Quarter

Indicator #2: AG Information Items Distributed/Month & Quarter

It is assumed that as the ISR period begins, baselines are zero on both these indicators, as initial plans are made for organizing site visits, conferences, and training courses, and for preparing and distributing flyers, articles, and reports. The ESR period should be used to obtain baselines so that projections for the project in the LR period can be made.

As we begin the exercise in measurement, the responsible Evaluation Unit should prepare to keep records of:

- AG Individual Exposure Hours (reducing the various dissemination activity types to hours and multiplying by attendance).
- AG Information Items Distributed (reducing various types of items -- flyers, reports etc. -- and maintaining counts on their distribution).

It may be found possible and useful to break down these recordings by audiences, so that exposure hours delivered to the general public, bankers/investors, entrepreneurs (etc.) and numbers of items distributed to such groups are differentiated. This will be particularly helpful if it is anticipated that future targets for dissemination achievement should be set separately for different groups. However, it is recommended that initially counting be of the totally aggregated exposure hours and information items distributed (per month and quarter). As these first steps proceed, inquiries should begin on sources of information regarding secondary effects such as: the actual "reach" of items

*AG = Agriculture-Geothermal.

distributed; the proliferation of the agriculture-geothermal theme in media.

B. Completing and Maintaining Data Entries

On the following pages, information forms for the Dissemination Sector are presented. Entries have been made as deemed appropriate at this time on Forms 1 and 2, the established status record for the sector. The other forms are introduced for use with the indicators cited on them. Recommended uses are:

Form 3-IV. Exploratory Indicator Register (ISR). In the ISR period, immediate efforts should be made to project values for Targeted Achievement on AG Individual Exposure Hours and on AG Information Items. Concurrently, notations should be made on the right-hand column on actual monthly achievements. (This requires that a records system be established immediately for counting Exposure Hours delivered and Information Items distributed.)

Form 4-IV. Exploratory Indicator Register (ESR). In the ESR period, examination should proceed of the thematic content analysis method. Recordings should reflect this effort to discover sources of such data and appropriate indicator units. If the effort is successful, a Form 5 can be begun, with "Actual Baseline Values" recorded periodically as a basis for LR baseline projections. (Of secondary priority is a Form 4 for exploring the multiplier "reach" of AG Information Items.)

Form 5-IV. Indicator Achievement Register (ESR). This form should be filled out for baselines on Exposure Hours and Information Items: recording "actual" hours delivered and items distributed for each month in 1987; and projecting baselines on both indicators for the remaining quarters while actual values continue to be recorded.

Form 6-IV. Indicator Achievement Register (LR). This form should be completed by mid-1989 for each of the two established indicators. It is hoped that by then a Form 6 for AG Theme Appearance in media can also be prepared.

Chart 1. Impact Plotting For Indicators. At this time, no entries can be made on this chart except that "AG Individual Exposure Hours" and "AG Information Items" will appear as the units on the left-hand vertical axis of separate charts. No numeric values for the scales on these charts can presently be inserted.

SECTOR IDENTIFICATION:	Dissemination of Agriculture-Geothermal Information
SECTOR PRIMARY OBJECTIVE:	Communication of the Agriculture-Geothermal message to elicit interest, acceptance, and participation among special interest groups and the general population in Quezaltenango (and throughout Guatemala)

INDICATORS

Number 1	Number 2	Number 3
<p>Definition: AG Individual Exposure Hours per month & quarter</p> <p>Computation Method: Hours of an AG dissemination activity delivered x numbers of recipients (aggregated for all dissemination activities).</p>	<p>Definition: AG Information Items Distributed per month & quarter</p> <p>Computation Method: Numbers of types of info items prepared x numbers of copies of each type distributed (aggregated for all types).</p>	<p>Definition:</p> <p>Computation Method:</p>

FINAL TARGET PROJECTIONS

	Number 1 (Target Value)	Number 2 (Target Value)	Number 3 (Target Value)
ISR	To be projected in Oct. '86	To be projected in Oct. '86	
ESR	To be projected by mid'88	To be projected by mid'88	
Long-Run	To be projected by mid'89 (using baselines in ESR)	To be projected by mid'89 (using baselines in ESR)	

SECTOR AND PURPOSE: Dissemination of Agriculture-Geothermal Information to communicate the AG message and elicit interest, acceptance, and participation among special interest groups and the general population.

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INDICATORS

	No. 1: AG Individual Exposure Hours/Mo. & Quarter	No. 2: AG Info Items Distributed/ Mo. & Quarter	No. 3:
Data Collection Method	Establish and maintain internal system for counting hours of activities delivered.	Establish and maintain internal system for counting numbers of copies of various items distributed.	
Data Collection Source	Internal records	Internal records	
Responsible Org. & Official	INDE Eval. Unit	INDE Eval. Unit	
Project Begin Value of Indicator	Zero	Zero	
Projected End Baseline Value	To be specified	To be specified	
Projected End Target Value	To be specified	To be specified	
TO BE ACCOMPLISHED	<u>Priorities</u> 1. Make quick projection for ISR. 2. Gather baseline data during ESR. 3. Examine possibilities during ESR of obtaining thematic content analysis data to replace first-order delivery of activities in impact analysis.	<u>Priorities</u> 1. Make quick projection for ISR. 2. Gather baseline data during ESR. 3. Examine problem and possibilities during ESR of detecting "reach" of -- and multipliers for -- distribution.	

Sector AG DisseminationIndicator(s) AG Indiv. Exposure Hours
AG Info Items Distribution

1986-87 Month/Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
October	Zero			
November				
December				
Quarter #1				
January				
February				
March				
Quarter #2				

Sector AG DisseminationIndicator AG Thematic Content in Media

1987-89 Mos./Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
<u>1987</u> Ap-Jn 1				
Jl-Sep 2				
Oc-Dec 3				
<u>1988</u> Jan-Mar 4				
Ap-Jn 5				
Jl-Sep 6				
Oc-Dec 7				
<u>1989</u> Jan-Mar 8				
Ap-Jn 9				

INDICATOR ACHIEVEMENT REGISTER: Extended Short Run

FORM 5-IV

Sector AG Dissemination

Indicator (s) AG Indiv. Exposure Hours
AG Info Items Distribution

(1987-89)	Actual or Projected Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Month/Qtr	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
Apr				
May				
Jun				
1				
Jul				
Aug				
Sep				
2				
Oct				
Nov				
Dec				
3				
<u>1988</u> 4				
5				
6				
7				
<u>1989</u> 8				
9				

INDICATOR ACHIEVEMENT REGISTER: Long Run

FORM 6-IV

Sector AG Dissemination

Indicator (s) AG Indiv. Exposure Hours
AG Info. Items Distribution

(1990-94)	Projected Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Quarter	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
<u>1990</u> 1				
2				
3				
4				
<u>1991</u> 5				
6				
7				
8				
<u>1992</u> 9				
10				
11				
12				
<u>1993</u> 13				
14				
15				
16				
<u>1994</u> 17				
18				
19				
20				

IMPACT PLOTTING FOR INDICATORS

CHART 1-IV

SECTOR: AG Dissemination

INDICATOR: Exposure Hours/Information Items

(Units in Hrs. or Items)

CHAPTER V. THE EMPLOYMENT SECTOR

A. Status of the Sector and Its Indicators

1. Rationale of the Sector Focus

Having an impact on employment -- creating jobs and decreasing unemployment -- is a basic objective of the Zunil Demonstration and the agriculture-geothermal initiative in general. This objective is in line with USAID purposes in agricultural projects in Guatemala since that agency is concentrating on improving the situation of the small farmer in the Altiplano -- including the reduction of unemployment and underemployment, particularly among the rural poor (basically found among the Mayan Indian population).

In approaching impact measurement in this sector, obviously the project does not begin without backdrop regarding the employment structure and unemployment. However, there are a number of problems in attempting to use existing data profiles as baselines for projecting trends from the past and then detecting the project's impact. The following brief discussion clarifies the problem.

The work force for the entire Department of Quezaltenango was reported to be 102,200 in 1986. Unemployment numbered only 1,911 for an unemployment rate of 1.9 percent. Figures for Zunil and its contiguous localities were not obtained, nor were data on unemployment for previous years for the Department or any administrative subunits. But these low unemployment figures do not appear to provide a valid basis for beginning the assessment of AG impact since they may obscure conditions of underemployment. Further exploration to discover unemployment and underemployment, particularly among the rural poor, seems necessary.

The problem of detecting change and trends from existing records is also exemplified in the following employment structure profile obtained from records maintained at SEGEPLAN.

Distributions In
Selected Principal Occupations 1973 and 1986
 (Department of Quezaltenango)

	<u>1973</u> (%)	<u>1986</u> (%)
Professional & Technical	3.50	3.50
Administrators	.77	.77
Office Workers	1.86	1.86
Sales Workers	6.74	6.74
Farmers	58.92	58.92
Transport Workers	2.20	2.20
Manual Workers	1.73	1.73
Service Workers	7.27	7.27

The figures on these gross categories are exactly the same for two points separated by 14 years. However, it should be noted that data on employment by major sectors did reveal some shifts between 1973 and 1986, for example:

	<u>1973</u> (%)	<u>1986</u> (%)
Agriculture	59.4	60.6
Industry	14.1	14.4
Commerce & Services	7.3	7.5
Services	11.2	11.4

Moreover, major changes can be noted in distribution figures for occupational categories in Quezaltenango in 1950:

	<u>1950</u> (%)
Professional & Technical	1.71
Administrators	1.38
Office Workers	1.28
Sales Workers	4.48
Farmers	63.99
Transport Workers	1.18
Manual Workers	1.36
Service Workers	6.83

The figures for 1950 show major decreases in farming by the 1970s, picked up by increases in professional, white collar, and service work. But these changes stabilize completely, according to the existing records, in the '70s and '80s.

Because of uncertainty about the data and to seek more sensitive (less gross) depictions of the employment structure, AG impact measurement should begin by maintaining its own employment structure data. It is recommended that initially (for the project) records be maintained on direct AG-facility job creation while efforts are made to make the existing employment data systems more accurate and more sensitive for detecting AG-associated jobs. At the same time, efforts should go forward to discover the multiplier effects of the AG-facility jobs, especially in transportation, warehousing, and service occupations. It is hoped that at the kickoff point for the LR period, baseline projections and achievement targets on employment can either combine directly-created and multiplier jobs or plot separate lines for these AG-related phenomena.

2. Proposed Indicators

Indicators that have been considered for measuring employment impact include units expressed in person-hours at facilities and in salary outlays. Interest was shown also in identifying subcategories by sex and ethnicity of employees and by the permanent/seasonal and skilled/unskilled nature of jobs. It is proposed that categories be chosen that focus clearly on job creation and that can eventually be absorbed most readily, and/or be compared with, existing recordings on employment/unemployment. (This leaves, presently, the consideration of changes expressed in money-value terms to other sectors.) At the same time,

it is proposed that separate records be kept, and separate targets be set, for creating employment for a most significant subgroup: Mayan Indians.

The following two indicators are proposed:

Indicator #1: Jobs Created by AG Activities/Month & Quarter

Indicator #2: Jobs Created for Mayan Indians by AG Activities/Month & Quarter

It is assumed again that baselines for both these indicators are zero as the ISR period begins, and we will further consider them zero as the ESR period begins. Since the ISR period (6 months) sees technical feasibility assessed at a pilot facility, and since it is not clear how the tests will be conducted and whether any paid staff will be employed, there is no need for Employment Sector plotting, targeting, and experimentation in the ISR period.

Specific employment targets have been set, however, for the ESR period when commercial feasibility is assessed and a commercially-operating facility is developed. These projections should be shown, against zero baselines, for the ESR while preparations are made for developing baselines on AG employment (and multiplier effects) in the ESR so that rational projections of baselines and achievement targets can be set for the LR. It is hoped that by the beginning of the LR period, specific gaps (for example, in Indian employment or under-employment) will have been detected that can be the logical targets of a second phase agriculture-geothermal project. This might mean later introducing an indicator in the Employment Sector that is expressed in money values and focuses on changes in income.

B. Completing and Maintaining Data Entries

In the following measurement instruments, sector status Forms 1 and 2 have been filled out with annotations. In the remaining instruments, Form 3 is omitted because exploratory recordings on employment in the ISR are considered unnecessary. Uses of the other forms should be:

Form 4-V. Exploratory Indicator Register (ESR). Beginning early in the ESR, exploration should be conducted on multiplier formulae and on achieving compatible and sensitive record keeping on employment and underemployment in established data systems. Notations on this form should summarize quarterly progress on these efforts. It is hoped that these efforts can then be reflected in the categories (including multipliers) appearing -- with baseline and achievement projections -- on Form 6.

Form 5-V. Indicator Achievement Register (ESR). This form should be filled out for the ESR based on the projections made for AG job creation in this period (and which are to be made for Mayan Indian job creation). Recordings will be of actual jobs created in the early quarters (into 1988) with projected baseline values shown for the remaining quarters (while actual values continue to be recorded in these later quarters).

Form 6-V. Indicator Achievement Register (LR). This form should be completed by mid-1989 for each of the two established (but possibly modified) indicators. It is hoped that by this point multiplier formulae can be applied and used in baseline projections and target achievement projections. The formulae, if developed, could be applied retrospectively to the ESR plottings of Form 5 to translate baseline values developed there into jobs-plus-multiplier-increments.

Chart 1. Impact Plotting For Indicators. This chart has been prepared for all AG jobs projected to be created in the baseline years. An Actual Achievement line would also be plotted for those years and would become the baseline used for the LR period (after decisions are reached on multiplier formulae). It appears obvious that a new scaling will be needed as the chart is prepared for use in the Future Project Years (the LR period).

Note that this guidance for the Employment Sector mandates immediate and direct attention to project impact on the Mayan Indian population. Careful attention and concerted effort in this regard are recommended, beginning with a projection in the ESR on jobs created for this group (among the 200 total jobs now projected).

SECTOR IDENTIFICATION:	Employment
SECTOR PRIMARY OBJECTIVE:	Increase employment (and decrease unemployment & underemployment) in Quezaltenango, especially among Mayan Indians

INDICATORS

Number 1	Number 2	Number 3
<p>Definition: Jobs Created by AG Activities/month & quarter</p> <p>Computation Method: Count of number of new jobs at AG facilities (eventually incremented by a multiplier factor); aggregate total new jobs cumulatively</p>	<p>Definition: Jobs Created for Mayan Indians by AG Activities/month & quarter</p> <p>Computation Method: Count of number of new jobs for Mayan Indians at AG facilities (eventually incremented by a multiplier factor); aggregate total new jobs cumulatively</p>	<p>Definition:</p> <p>Computation Method:</p>

FINAL TARGET PROJECTIONS

	Number 1 (Target Value)	Number 2 (Target Value)	Number 3 (Target Value)
ISR	Not projected	Not projected	
ESR	200	To be projected by mid'88	
Long-Run	To be projected by mid'89 (using baselines in ESR)	To be projected by mid'89 (using baselines in ESR)	

SECTOR AND PURPOSE: Employment: creating jobs through Agriculture-Geothermal enterprises and their multiplier effects, with a special targeting on job creation for Mayan Indians

INDICATORS

	No. 1: Jobs Created by AG Activities /Mo. & Quarter	No. 2: Jobs Created for Mayan Indians by AG Activ's/Mo. & Qtr	No. 3:
Data Collection Method	Establish & maintain internal system for recording jobs created; liaison to Guild re multiplier effects	Establish & maintain internal systems for recording jobs created; liaison to Guild re multiplier eff's	
Data Collection Source	Internal records/Guild	Internal records/Guild	
Responsible Org. & Official	INDE Eval. Unit	INDE Eval. Unit	
Project Begin Value of Indicator	Zero	Zero	
Projected End Baseline Value	ESR: 200	To be specified	
Projected End Target Value	ESR: 200	To be specified	
TO BE ACCOMPLISHED	<ol style="list-style-type: none"> 1. Monitor increments toward final target in ESR. 2. Work with Guild on multiplier formulae. 3. Work with SEGEPLAN to sensitize estab'd record systems to detecting underemployment & to blend project categories with those in existing data systems. 	<ol style="list-style-type: none"> 1. Make projection for ESR & monitor increments toward this final target. 2. Work with Guild on multiplier formulae. 3. Work with SEGEPLAN to sensitize estab'd record systems.... 	

Sector EmploymentIndicator(s) AG Job Creation/Mayan Job Creation

1987-89 Mos./Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
<u>1987</u> Ap-Jn 1				
Jl-Sep 2				
Oc-Dec 3				
<u>1988</u> Jan-Mar 4				
Ap-Jn 5				
Jl-Sep 6				
Oc-Dec 7				
<u>1989</u> Jan-Mar 8				
Ap-Jn 9				

INDICATOR ACHIEVEMENT REGISTER: Extended Short Run

FORM 5-V

Sector Employment

Indicator AG Job Creation/Mayan Job Creation

(1987-89)	Actual or Projected. Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Month/Qtr	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
Apr				
May				
Jun				
1				
Jul				
Aug				
Sep				
2				
Oct				
Nov				
Dec				
3				
<u>1988</u> 4				
5				
6				
7				
<u>1989</u> 8				
9			200	

INDICATOR ACHIEVEMENT REGISTER: Long Run

FORM 6-V

Sector Employment

Indicator AG Job Creation/Mayan Job Creation

(1990-94)	Projected Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Quarter	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
<u>1990</u> 1				
2				
3				
4				
<u>1991</u> 5				
6				
7				
8				
<u>1992</u> 9				
10				
11				
12				
<u>1993</u> 13				
14				
15				
16				
<u>1994</u> 17				
18				
19				
20				

IMPACT PLOTTING FOR INDICATORS

CHART 1-V

SECTOR: Employment

INDICATOR: Jobs Created by AG Activities

Jobs Created

CHAPTER VI. THE AGRICULTURAL ACTIVITIES SECTOR

A. Status of the Sector and Its Indicators

1. Rationale of the Sector Focus

In the current development plans of USAID in Guatemala, increasing the productivity of farmers in the Altiplano, along with increasing their incomes, is a major objective. The development of agribusiness, providing small farmers with profitable outlets for their crop production, is a part of this objective. And USAID has had a long-standing concurrent objective of increasing crop diversification in the Altiplano of Guatemala.

As stated by the AG project planners, and agreed to by those associated with and preparing to participate in the project, the development of agro-industry is a prime project objective. Associated with this development, it is assumed, will be changes in the amounts, types, and values of crops produced; while changes will also appear in methods of cultivation that contribute to productivity and income generation among farmers.

The problem faced in preparing to measure impact of agriculture-geothermal initiatives on agricultural activities is what to focus on in obtaining experience in the short run for continuing to assess significant kinds of impact in a later, long-run period. How directly should one focus upon activities actually occurring at AG facilities (that are becoming commercial, private enterprises)? How much should the focus be on the land (the agricultural fields), the crops grown there and the activities carried on there? Should measurement try to identify crops grown for processing through AG facilities, or is it sufficient to measure changes in crop production in Quezaltenango and its subregions

after the introduction of AG facilities without seeking a direct linkage between changes in the fields and activities at the facilities? And should impact be measured in money terms as well: in changing values of crops produced and what this means to farmer incomes and in monetary productivity per hectare cultivated?

Existing records on agricultural productivity are not very helpful in searching for baselines for impact in agricultural activities. They present facts on the major crops grown in Quezaltenango and its subareas (municipalities), breaking out "number of farms," "surface harvested" (in manzanas -- units of 1.75 acres), and "production" (in quintales -- units of 46 Kg) for different crops. For the Department of Quezaltenango, the following crops rank highest in production (with figures on these crops for Quezaltenango City and Zunil also shown):

	<u>Quezaltenango</u> <u>Department</u>	<u>Quezaltenango</u> <u>City</u>	<u>Town of</u> <u>Zunil</u>
	(Production in Quintales 1978/1979)		
Coffee (grown alone)	1,536,999	-	1,734
Corn (grown alone)	536,579	20,286	5,865
Corn (grown w/other crops)	207,000	534	751
Wheat (grown alone)	207,000	24,580	-
Potatoes (grown alone)	73,147	3,477	350
Beans (grown w/other crops)	9,621	887	47
Cardomom (grown alone)	7,736	-	213

From these figures, some profiling of present agricultural production in Quezaltenango can be obtained. But the AG Demonstration at Zunil has not reached a final decision on the crops that will be processed, and thus on the "money crops" whose expanded production should change the existing profile. Therefore, it is deemed inappropriate to use profile data of this type for past years as a basis for projecting baselines on crop production against which impact projections for a changed profile are made. It is granted, however, that if data on

productivity in quintales per hectare or manzana (or in money value produced per hectare or manzana) are available for the past, this would provide a basis for projecting a baseline against which a targeted AG project could strive to have positive impact. Moreover, it may be possible to make this transformation by combining data on "surface harvested" and "productivity" and creating a mean or average productivity per hectare or manzana for Quezaltenango and subareas of that Department.

Again, we are back to plotting data in the ESR to obtain baselines and a rationale for projections in the LR. It is proposed that in this step the focus be kept, initially, close to the AG facilities themselves although one indicator should refer to phenomena on the land. And it is further proposed to defer monetary values in indicators to the considerations of the Market Sector.

2. Proposed Indicators

In deliberations of the Zunil Demonstration planners, a number of possible indicators of impact on agricultural activities were discussed. These included: numbers of hectares planted and harvested (and in different types of crops); tons of fertilizer and tons of seed used in the fields; and technological changes on the land reflected in different farming practices. The planners also revealed one clear activities target of the demonstration, as it moves toward operation of a commercial plant, in stating that achieving capacity at the initial commercial facility will mean processing 6 tons of produce per day (2 tons per shift times 3 shifts).

Before proceeding to propose indicators for this sector, we must take cognizance of the units of weight and area used by the AG planners. They spoke constantly of "tons" and "hectares." Therefore, these terms will be used in our initial formulations of indicators -- acknowledging that these units do not appear to be compatible presently with existing record systems and that accommodation by the project to established data systems may be necessary.

Attempting to account immediately for AG-related production while preparing to detect impact on productivity on the land, the following two indicators are proposed:

Indicator #1: Tons of Crops Processed by AG Facilities/Month
& Quarter

Indicator #2: Tons of Crops Harvested Per Cultivated Hectare/
Month & Quarter

Baseline for the first indicator is assumed to be zero in the ISR and at the beginning of the ESR, and a baseline trend can be established in that period. Not to be ruled out is the possibility that other facilities (than the planned freezer plant) will come on line in the ESR and contribute to baseline data on AG processing activities.

For the second indicator, work must proceed on baseline measures during the ESR to discover data on production per hectare (making transforming computations from existing data where necessary and also resolving conflicts regarding appropriate weight/area units). AG planners should also explore whether projections for the LR should be expressed in monetary units of productivity (for example, quezales per hectare) or whether productivity should continue to be

measured in volume terms, uninfluenced by changing currency-value cycles. Also to be considered is whether it is more appropriate to measure productivity per all available hectares (on all farms) or to measure productivity per cultivated/planted hectare.

For the first indicator, a projected achievement value is shown for the ESR period. This was obtained from the aforementioned projected capacity of the planned commercial facility. It assumes an average of 20 working days in a month and an effort to reach daily capacity of 6 tons. Thus a target of 120 tons of crops processed per month is projected.

B. Completing and Maintaining Data Entries

Sector status Forms 1 and 2 have been filled out. In presenting the other forms and indicating their uses, Form 3 is included in this instance because it is recommended that efforts begin immediately with SEGEPLAN to resolve the many problems with Indicator #2. Uses of all forms are proposed as follows:

Form 3-VI. Exploratory Indicator Register (ISR). Beginning immediately, AG project planners should establish liaison with SEGEPLAN to consider ways to obtain baselines on hectare productivity, resolve conflicts over measurement units, and pursue the aggregation of data by subregions of the Department. Monthly notations should summarize progress on these efforts.

Form 4-VI. Exploratory Indicator Register (ESR). This form should be used to continue and extend the explorations with SEGEPLAN on the hectare productivity indicator and its baselines. It is hoped that these efforts can be reflected in baseline achievement projection values on a Form 6 by mid-1989.

Form 5-VI. Indicator Achievement Register (ESR). It is not anticipated that issues regarding Indicator #2 will be resolved soon enough so that a Form 5, making projections for that indicator, can be completed for part of the ESR period. Therefore, this form should be used during the ESR for Indicator #1, making final Target projections on tonnage processed and working back to a start point. Actual achievement values by month and

quarter should be recorded (whenever achievements begin) in both the first (Baseline Values) column and the third (Actual Achievement Values) column. Careful attention should be paid during the ESR, in maintaining this record, to the appearance of processed tonnage at other AG facilities in the Department and to including this tonnage in the totals.

Form 6-VI. Indicator Achievement Register (LR). This form should be completed, with all baseline and target projections, by mid-1989 for each of the two indicators.

Chart 1. Impact Plotting For Indicators. This chart has been prepared for the projection during the ESR on Indicator #1 -- crop tonnage processed at AG facilities. As in the projection made in the Employment Sector, the line is shown to begin at the beginning of 1987, although this is not realistic. Thus, although final target values (for tonnage processed in the Ag Activities Sector and jobs created in the Employment Sector) are entered on Forms 5-VI and 5-V respectively, no effort is made to fill in increments for preceding ESR periods (since a start point cannot be realistically assigned).

SECTOR IDENTIFICATION:	Agricultural Activities
SECTOR PRIMARY OBJECTIVE:	To promote the development of agro-industry (processing agricultural produce) and increase productivity of farmers in Quezaltenango

INDICATORS

Number 1	Number 2	Number 3
Definition: Tons of Crops Processed by AG Facilities	Definition: Tons of Crops Harvested Per Hectare Cultivated	Definition:
Computation Method: Count of total tonnage of crops processed, aggregated to monthly totals	Computation Method: Divide total tons of crops harvested by no. of hectares cultivated; express as no./Q amounts (allowing for seasonality in projections & comparisons)	Computation Method:

FINAL TARGET PROJECTIONS

	Number 1 (Target Value)	Number 2 (Target Value)	Number 3 (Target Value)
ISR	Not projected	Not projected	
ESR	120	Not projected	
Long-Run	To be projected by mid'89 (using baselines in ESR)	To be projected by mid'89 (using baselines in ESR)	

SECTOR AND PURPOSE: Agricultural Activities: promoting the development of agro-industry (that processes agricultural produce) and increasing productivity of farmers

INDICATORS

	No. 1: Tons of Crops Processed by AG Facilities/Mo. & Quarter	No. 2: Tons of Crops Harvested Per Hectare Cultivated/Mo. & Q	No. 3:
Data Collection Method	Establish & maintain internal system for recording tons processed	Establish & maintain internal system for developing computation capability; liaison to SEGEPLAN	
Data Collection Source	Internal records	Internal records	
Responsible Org. & Official	INDE Eval. Unit	INDE Eval. Unit	
Project Begin Value of Indicator	Zero	Zero	
Projected End Baseline Value	ESR: 120	To be specified	
Projected End Target Value	ESR: 120	To be specified	
TO BE ACCOMPLISHED	<ol style="list-style-type: none"> 1. Monitor increments toward final target in ESR. 2. Assure data flow for records from all AG facilities. 3. Work with SEGEPLAN to incorporate AG processing tonnage in established record systems. 	<ol style="list-style-type: none"> 1. Make projections before end of ESR. 2. Work with SEGEPLAN on applying transforming computations on productivity to existing data, & to resolve conflicts re units of measurement. 3. Work with SEGEPLAN to obtain data aggregations by subregions of Quezaltenango. 	

Sector Agricultural ActivitiesIndicator Tons of Crops Harvested Per Hectare Cultivated

1986-87 Month/Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
October				
November				
December				
Quarter #1				
January				
February				
March				
Quarter #2				

Sector Agricultural ActivitiesIndicator Tons of Crops Harvested Per Hectare Cultivated

1987-89 Mos./Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
<u>1987</u> Ap-Jn 1				
Jl-Sep 2				
Oc-Dec 3				
<u>1988</u> Jan-Mar 4				
Ap-Jn 5				
Jl-Sep 6				
Oc-Dec 7				
<u>1989</u> Jan-Mar 8				
Ap-Jn 9				

INDICATOR ACHIEVEMENT REGISTER: Extended Short Run

FORM 5-VI

Sector Agricultural Activities

Indicator Tons of Crops Processed by AG Facilities

(1987-89)	Actual or Projected. Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Month/Qtr	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
Apr				
May				
Jun				
1				
Jul				
Aug				
Sep				
2				
Oct				
Nov				
Dec				
3				
<u>1988</u> 4				
5				
6				
7				
<u>1989</u> 8				
9			120	

INDICATOR ACHIEVEMENT REGISTER: Long Run

FORM 6-VI

Sector Agricultural Activities

Indicator (s) Tons of Crops Processed by AG Facilities
Tons of Crops Harvested Per Hectare Cultivated

(1990-94)	Projected Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Quarter	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
<u>1990</u> 1				
2				
3				
4				
<u>1991</u> 5				
6				
7				
8				
<u>1992</u> 9				
10				
11				
12				
<u>1993</u> 13				
14				
15				
16				
<u>1994</u> 17				
18				
19				
20				

IMPACT PLOTTING FOR INDICATORS

CHART 1-VI

SECTOR: Agricultural Activities

INDICATOR: Tons Processed by AG Facilities/Mo.

CHAPTER VII. THE MARKETS SECTOR

A. Status of the Sector and Its Indicators

1. Rationale of the Sector Focus

The Markets Sector is probably most vital of all, given the objectives and long-range goals of the project and the entire AG initiative. Even from a great distance the focus is on exports and how agricultural products, made exportable by geothermal processing, can contribute to the economic wellbeing of Guatemala. But getting to overseas exports and their measurement is a long road. And even the intermediate steps -- exports from the department but within the country (Guatemala); exports from the department and country but within Central America -- are more difficult to measure since they are more secondary than primary impacts of the geothermal project. Nevertheless, plans must be made for projection and measurement in this sector. And as we attempt to prepare the way for measurement of AG impacts on markets, we will now introduce indicators expressed in terms of monetary values -- since these kinds of units are the essence of market transactions.

In exploring data sources relevant to possible baselines and indicators in the Markets Sector, little focused information was discovered (granted our search was limited). Little could be found about market processes in Quezaltenango; and in deliberations about the project, the regional planners and database managers of SEGEPLAN said they did not maintain data on exports from departments of Guatemala. Broad, nationwide data reflecting trends in balance of trade, inflation, debt service as percent of exports for Central American countries are readily available in World Bank and USAID publications. But little was discovered on market phenomena within Guatemala and its departments

and municipalities. Still, the AG project has the advantage of working with a private sector guild -- Gremial de Exportadores de Productos Notradicionales -- which by its very name indicates an interest not only in business development but in export business. And this resource should be used both in accessing relevant baseline market data and in collecting information on AG business investment as it occurs and on AG-related exports as they begin to flow.

Since direct, active efforts have been made by AG project planners to contact, interest, and involve the private sector through this guild, these "contact activities" themselves might be considered as possible units for impact measurement -- steps on the road to investment. But such processes would never be recorded, now or in the future, in established data systems. So it seems best to leave this type of indicator in the Dissemination Sector.

Thus, as difficult as it may be, and as distant as detected impacts may be, it seems necessary to focus in the Markets Sector on money-flow in investment and eventually on money transactions reflected in agricultural exports. Furthermore, a vista on markets is opened very quickly by the condition that the guild is to be the initiator and catalyst of market processes related to the AG Demonstration facility. The guild will see to the supply of agricultural produce even in the pilot-facility phase of the ISR period although it has not decided on the mechanism to be used in this initial market flow. The AG planners, however, are relying on a market process to emanate from these early supply efforts; and as this process unfolds in the ESR, they hope to obtain information that will permit the establishing of a rate structure for commercial users of geothermal energy.

In preparing to use the ESR period as a time for obtaining a better fix on market data related to the AG project, again we propose one focus very close to the specific activities that begin at Zunil and another on the farther horizon of exports. A basic problem is that, to our knowledge, marketing of agricultural produce tends to be an informal process in the municipalities of Quezaltenango; and although middlemen operate in this process, few of these merchants could be designated "agri-businesses." It is the growth of true agro-industry that processes money crops and prepares them for bulk sale -- hopefully in exports -- that must be monitored, beginning in the ESR (demonstration) period of the AG project and extending then into an LR period when, it is hoped, privatized commercialization goes forward at an accelerated rate.

2. Proposed Indicators

In discussions among AG planners and interested participants, a number of facets of the evolving market processes were considered as possible foci for measurement. These included:

- Sales at AG facilities
- Volume of shipments and their values
- Consumer transactions (purchases of AG products)
- Volume and value of exports:
 - From local area across the department
 - From the department across Guatemala
 - From the department (and from Guatemala) across Central America
 - From the department (and from Guatemala) overseas (outside Central America)

Synthesizing toward the distinct foci alluded to above, and introducing the money factor in the units of measurement, we propose the following two indicators for the Markets Sector:

Indicator #1: Investment in AG Enterprises (Expressed in Quezales) /
Month & Quarter

Indicator #2: Value in Quezales of International Exports of Guatemalan
Agricultural Produce/Month & Quarter

It is assumed (but not known for sure) that private investment in AG enterprises has a present baseline of zero, although some other types of investment funds (IDB, USAID) may be noteworthy -- and may warrant inclusion in calculations of AG investment. A decision on what to include and whether to concentrate on private-sector funding must be reached. It is recommended that this indicator be expressed (like the jobs indicator) in cumulative totals of Quezales appearing on the books of enterprises, banks, and other institutions as invested in AG-processing enterprises. At the outset we propose that the focus be kept linked to AG processing and that discovery of multiplier effects be given a secondary priority. However, even at the outset we would favor expanding this definition of AG business enterprises to include the wholesale marketing aspect of the business.

The second indicator presents many problems. We have not identified baseline data on exports of agricultural produce from Guatemala although we are sure such data exist and can be used to project extended baselines. Moreover, it should be noted that we are proposing that preparations be made from the start to measure impact of this AG project (and its future phases) on the agricultural export picture as a whole. This clearly permits the immediate use of

existing baselines (once they are discovered), while a baseline at the beginning of the ISR period which referred to exports of AG-processed produce would have to be expressed as zero. Thus, we do not propose that the identification of exported produce with its AG-processing origins be maintained in measuring achievements against baselines. However, it is probable that this identification will not be difficult to make through time, since export data may attach the label "processed" -- but probably not the label "geothermal processed" -- to a category of agricultural produce in calculating export volume and value.

Another problem in preparing for impact measurement in terms of exports is the earlier one cited regarding maintenance of data on exports from departments. If such records are not presently kept, it will be important to see that they are kept in the future, since impact radiating from the Zunil Demonstration and its immediate commercial spinoffs should be detected first in agricultural exports from the Department of Quezaltenango. On the road to actual international agricultural exports that improve Guatemala's balance-of-trade/balance-of-payments situation, it should be of value to begin by measuring agricultural exports from the Department of Quezaltenango: across the country; outside the country but within Central America. As soon as possible, the effort should be made to keep track of that volume (and its value) that actually goes to foreign countries outside Central America.

This extended prologue anticipates that the guidance which follows is heavily weighted with exploratory activities -- activities that require especially, for this sector more than any other, the cultivation of relationships by the AG project planners and monitors.

B. Completing and Maintaining Data Entries

Status summaries for the sector are shown in Forms 1 and 2. Uses of other forms are proposed as follows:

Form 3-VII. Exploratory Indicator Register (ISR). Even in the ISR period, and as soon as possible, working relationships should be established with the Guild and SEGEPLAN to begin to resolve problems on both indicators, obtain export baseline data, and prepare to obtain relevant data from both these organizational sources. Monthly notations should summarize progress.

Form 4-VII. Exploratory Indicator Register (ESR). Total agricultural export baselines should be discovered quickly. However, this extension of explorations needs to continue for both indicators. On Indicator #1, efforts will continue to obtain data on investments systematically, and by the end of 1988, a projected target on investment may be attempted (recorded for the last quarters of the ESR on Form 5). Regarding Indicator #2, a Form 5 showing projected baseline values (column 1) should be completed quickly; but explorations (and notations regarding them) should continue on Form 4 as problems are addressed and resolved (mainly with SEGEPLAN) regarding possible steps in export measurement and collecting and maintaining data on exports from departments: within Guatemala; in Central America; outside that region.

Form 5-VII. Indicator Achievement Register (ESR). As indicated above, an attempt to move to this register for Indicator #1 (Investment) should be made toward the end of the ESR period (projecting baselines and targets). For Indicator #2, while no information for this period on target values and achievement values can probably be recorded (except, possibly, on out-of-department exports), it should be possible very early in the ESR to complete column 1, projecting a baseline on total agricultural exports from data on pre-1987 years.

Form 6-VII. Indicator Achievement Register (LR). From the present point in time, it is difficult to estimate how totally this culminating form (prepared on the threshold of future, targeted projects) can be prepared for our two indicators by mid-1989. Hopefully, Investment experience will be sufficient to make baseline and target projections possible. On Exports, while baseline values should be readily recordable, target values may be difficult to project if targets are truly set at that time as AG project impacts on the total picture of agricultural exports from Guatemala.

Chart 1. Impact Plotting For Indicators. No projections (baseline or target) are shown on this chart for either indicator as preparations for measurement and plotting begin. Units that eventually will appear on the vertical scale will be expressed in Quezales.

SECTOR IDENTIFICATION:	Markets
SECTOR PRIMARY OBJECTIVE:	To promote investment in AG agro-industry and increase exports of agricultural produce from Guatemala

INDICATORS

Number 1	Number 2	Number 3
<p>Definition: Investment in AG Enterprises (Expressed in Quezales)</p> <p>Computation Method: Count & aggregate Quezales invested in AG enterprises (aggregate to cumulative monthly totals)</p>	<p>Definition: Value in Quezales of Int'l Exports of Guatemalan Ag'l Produce</p> <p>Computation Method: Count & aggregate value in Quezales of agricultural produce sold in int'l export (non-cumulative monthly totals)</p>	<p>Definition:</p> <p>Computation Method:</p>

FINAL TARGET PROJECTIONS

	Number 1 (Target Value)	Number 2 (Target Value)	Number 3 (Target Value)
ISR	Not projected	Not projected	
ESR	Attempt to project by end of '88	Probably not projected	
Long-Run	To be projected by mid'89 (using baselines in ESR)	Projection uncertain; may not occur until early LR yrs	

SECTOR AND PURPOSE: Markets: promoting investment in AG agro-industry and increasing exports of agricultural produce from Guatemala

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INDICATORS

	No. 1: Investment in AG Enterprises (Expressed in Q's)/Mo. & Qtr	No. 2: Value in Q's of Int'l Exports of Guatemalan Ag'l Produce	No. 3:
Data Collection Method	Establish & maintain internal system for recording investment data/liaison to "Guild" & SEGEPLAN	Establish & maintain internal system for recording export data/liaison to "Guild" & SEGEPLAN	
Data Collection Source	Probably "The Guild"	Probably SEGEPLAN or other Govt. Agency	
Responsible Org. & Official	INDE Eval. Unit	INDE Eval. Unit	
Project Begin Value of Indicator	(Probably) Zero	Unknown but obtainable	
Projected End Baseline Value	To be specified	To be specified	
Projected End Target Value	To be specified	To be specified	
TO BE ACCOMPLISHED	<ol style="list-style-type: none"> 1. Estab. close rel. w/Guild to obtain help in collecting/maintaining investment data. 2. Reach decisions on definitions (inclusion/exclusion of non-private investment; delimiting of AG enterprises). 3. Make projections on targets for end of ESR as soon as experience accumulates; & project for LR. 	<ol style="list-style-type: none"> 1. Estab. close rel. w/SEGEPLAN (& thru it w/other econ. data-gathering agencies); advocate maintenance of export data by depts. 2. Determine ag. export baselines from previous years. 3. Reach decisions on steps in export measurement: from dept.... from Country. 	

Sector MarketsIndicator Investment in AG EnterprisesInt'l Exports of Ag. Products from Guatemala

1986-87 Month/Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
October				
November				
December				
Quarter #1				
January				
February				
March				
Quarter #2				

Sector MarketsIndicator Investment in AG Enterprises

Int'l Exports of Ag. Products from Guatemala

1987-89 Mos./Quarter	Possible Base- line Values	Notes: (Possible units & sources)	Targets/Achieve- ments (Test Use)	Notes: (Experience with targeting)
<u>1987</u> Ap-Jn 1				
Jl-Sep 2				
Oc-Dec 3				
<u>1988</u> Jan-Mar 4				
Ap-Jn 5				
Jl-Sep 6				
Oc-Dec 7				
<u>1989</u> Jan-Mar 8				
Ap-Jn 9				

INDICATOR ACHIEVEMENT REGISTER: Extended Short Run

FORM 5-VII

Sector Markets

Indicator Investment in AG Enterprises

Int'l Exports of Ag. Products from Guatemala

(1987-89)	Actual or Projected. Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Month/Qtr	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
Apr				
May				
Jun				
1				
Jul				
Aug				
Sep				
2				
Oct				
Nov				
Dec				
3				
<u>1988</u> 4				
5				
6				
7				
<u>1989</u> 8				
9				

INDICATOR ACHIEVEMENT REGISTER: Long Run

FORM 6-VII

Sector Markets

Indicator Investment in Ag Enterprises

Int'l Exports of Ag. Products from Guatemala

(1990-94)	Projected Baseline Values	Projected Target Values	Actual Achievement Values	Impact Values
Quarter	Indicator Values	Indicator Values	Indicator Values	(%) (AAV/PTV)
<u>1990</u> 1				
2				
3				
4				
<u>1991</u> 5				
6				
7				
8				
<u>1992</u> 9				
10				
11				
12				
<u>1993</u> 13				
14				
15				
16				
<u>1994</u> 17				
18				
19				
20				

IMPACT PLOTTING FOR INDICATORS

CHART 1-VII

SECTOR: Markets

INDICATOR: Quezales in AG Investment/Int'l Export

PART THREE: COMPUTER INSTRUCTIONS

Development Corporation

A. PROJECT PERFORMANCE TRACKING

This guidance to computerized calculation, maintenance and display of information in the Impact Measurement System is designed for tracking project performance on individual indicators. The Lotus 1-2-3 program provided can be used immediately as experimentation proceeds in the ESR period with baselines and their projections. The program is intended, basically, for maintaining graphic displays, based on established baseline and target values (recorded in Form 6), for the Long Run period when the project is managed against specific targeted indicator objectives and Impact Achievement scores are produced for each quarter.

1. General

In many cases, project performance can be displayed graphically to track the deviation from the objective. This permits early identification of project aspects -- related to specific indicators -- which require more intensive management because of difficulties in maintaining the desired rate of improvement.

A Lotus 1-2-3 (Version 1A) spreadsheet has been set up to graph project performance on various indicators over a period of eight years: three baseline years followed by five project years. A separate 5.25" floppy diskette is maintained for each indicator which is being monitored. For each indicator, the user enters three values when the diskette is first set up:

- Baseline beginning value
- Baseline value at the end of the third year
- Target value at the end of the fifth project year

The spreadsheet program uses these data points to plot straight lines for the baseline value, the extended baseline and the projected project performance on the indicator.

The actual project performance on the indicator is entered quarterly by the user.

The Lotus spreadsheet automatically maintains two graphs. A plot of values by quarter is maintained in the graph named Values. A plot of the relative percent achievement versus the target value is maintained in the graph named Percents.

2. Using the Spreadsheet

The spreadsheet has been write protected to allow data entry only in the three standard data items (cells F6, F8, F10) and the actual quarterly results. Calculation of percentage achievement and plotting of the data are handled automatically by Lotus once the data have been input.

In general, it is necessary to enter the indicator descriptive data the first time the spreadsheet is used. Future updates only require the actual performance to be entered and the updated graph to be generated.

When the Lotus macro instructions are being used ([alt] P, for example), it is important to wait until the program has paused before hitting any key. If you hit the [esc] key, for example, before the program has paused, it will interrupt the macro and some of the macro instructions may appear at the top of the screen, in one of the spread sheet cells, or somewhere else. This confusing, but not fatal, situation is avoided by going slow. In the unlikely event that you do not follow these instructions and you ruin your spreadsheet,

DO NOT HIT [alt] Q!!!

The session can be restarted by

/FR[return]

This will recall the original spreadsheet which existed at the start of the session.

2.1 Initial Entry

A separate spreadsheet file is required for each indicator to be tracked. To start accumulating data for a new indicator, copy the indicator impact diskette to another diskette for the new indicator. The files on this diskette are AUT0123.WKS, PERCENTS.PIC, TRACK.DOC, and VALUES.PIC. For example, to start tracking the indicator named "TESTWORK", copy these files to a new diskette using the DIS DISKCOPY command:

DISKCOPY A: B:

Then start the Lotus 1-2-3 program using the new diskette. Additional instructions for both hard disk and two disk computers are in Section B of these instructions.

After entering Lotus 1-2-3, the program automatically loads the spreadsheet (which is named AUT0123.WKS) into memory. After the spreadsheet has loaded, enter the project data as follows:

Enter the baseline beginning value in cell F6,

Enter the baseline value at the end of year 3 in cell F8,

Enter the target value after the fifth project year in cell F10.

As these quarterly items are entered, the computer will calculate the quarterly baseline, extended baseline and projected values.

To enter a title for the indicator, and a name for the Y axis, press the [alt] T keys simultaneously. A menu will appear requesting whether the Values graph or the Percents graph is to be used. Initially, both graphs should be updated in sequence. It is possible to change titles later if you wish. The following key sequence updates both titles:

[alt] T	Tell the program to enter a title
Values [return]	Select Values
	The Values graph will appear
[esc]	This removes the graph from the screen
TEST PLOT [return]	Enters the title "TEST PLOT"
TEST DATA [return]	Names the Y axis "TEST DATA"
[alt] T	Tell the program to enter a title
Percents [return]	Select Percents
	The Percents graph will appear
[esc]	This removes the graph from the screen
TEST PLOT [return]	Enter the title "TEST PLOT"
TEST DATA [return]	Names the Y axis "TEST DATA"

Once the titles have been entered it is generally unnecessary to access the [alt] T instruction again.

The next step is to set up the scale for the graphs. This only needs to be done when the target value is changed. If the target value is not changed between runs, it is not necessary to run the setup instruction again. To set up the graph scales for both graphs, use the following key sequence:

[alt] S	Tell the program to setup the graph scale
	The values graph will appear on the screen
[esc]	This removes the graph from the screen
	The percents graph will appear on the screen
[esc]	This removes the percents graph from the screen

2.2 Updating the Plots

The spreadsheet has been designed for quarterly update. Each quarter during the project years, the actual measured performance is entered in the appropriate cell in column H of the spreadsheet. For example, the first quarter performance in year 1 is entered in cell H31. Second quarter performance is entered in cell H32, etc. Cells for the baseline years have been write protected, so performance data cannot be entered in these cells.

2.3 Preparing the Graphs for Printing

Each time the data are updated, both graphs can be prepared to be printed using the [alt] P key sequence as follows:

[alt]	Tells the program to print both graphs The values graph appears on the screen
[esc]	This removes the graph from the screen The percents graph appears on the screen
[esc]	This removes the graph from the screen

The [alt] P instruction automatically saves a VALUES graph in the file called VALUES.PIC; it saves a PERCENTS graph in the file called PERCENTS.PIC.

If you are maintaining several project indicator files on the same diskette, each [alt] P instruction is saving the graph in the same two files. If you have followed the instructions to maintain a separate diskette for each indicator, this will not be a problem. Novice users are therefore advised to maintain a separate diskette for each project indicator.

2.4 Exiting the Program

After updating the spreadsheet and saving the graphs, exit Lotus by using the key sequence:

[alt] Q

This saves the file and quits Lotus 1-2-3.

3. Printing Graphs Using Lotus Printgraph

The Lotus system prints graphs using a separate program GRAPH. You can execute this program either through the Lotus access system, by selecting Printgraph, or from DOS by typing GRAPH.

By maintaining a separate diskette for each indicator, each disk has only two graph files, VALUES.PIC and PERCENTS.PIC.

When the Printgraph menu appears, the following instructions will print both the Values and the Percents graph on your printer:

S [return] G	This will print the PERCENTS GRAPH
S [space] [down] [return] G	This will print the VALUES graph
QY	Quit the Printgraph program

NOTE: In other versions of Lotus, these instructions may have changed to:

I [return] G
I [space] [down] [return] G
EY

4. Remarks

This Lotus spreadsheet has been designed for use by the Lotus novice. Minimum knowledge of Lotus 1-2-3 is required for someone to use this program. The user is invited to use this spreadsheet as a learning experience to become familiar with this powerful program, since it can be used to increase your personal productivity in many areas.

B. ADDITIONAL INSTRUCTIONS

1. Computers With Two Disk Drives

When using a computer which has two disk drives, the Lotus disk runs from Drive A and the project impact disk runs from drive B.

1.1 Preparing A New Project Impact Diskette

Put the Project Impact Diskette in drive A. Put a blank formatted diskette into drive B. (A separate diskette should be used for each project indicator.)

Copy the files from A to B:

DISKCOPY A: B:

1.2 Running Lotus

Remove the Project Impact Diskette from drive A. Insert the Lotus system diskette. Leave the other diskette in drive B. Start up Lotus as usual.

When Lotus 1-2-3 starts running, the project impact spreadsheet loads automatically.

As necessary (to run Printgraph, for example), switch the Lotus diskettes in drive A, always leaving the data diskette in drive B.

NOTE: This is a convenient way of running Lotus for two disk machines. It can be made easier by initializing the Lotus program to always consider drive B as the default drive. This is done by:

/FDB:\[return]
/WGDU

2. Computers With A Hard Disk Drive

When using a computer which has a hard disk drive, the Lotus program runs from Drive C (the hard disk) and the project impact disk runs from a floppy disk drive. For an IBM PC, or compatible, this is drive B. In the following writeup, we assume a PC is being used, and the data diskette will be run from drive A.

2.1 Preparing A New Project Impact Diskette

Put the Project Impact Diskette in drive A. Prepare a blank formatted diskette. (A separate diskette should be used for each indicator.)

Copy the files from A to B:

DISKCOPY A: B:

The computer will prompt for the blank formatted diskette to be inserted in drive A after it has read the files from the Project Impact Diskette.

2.2 Running Lotus

Leave the new data diskette in drive A. Start up Lotus as usual. Many hard disk versions of Lotus have been configured so they will run without the Lotus System diskette in drive A. However, depending on the configuration and version of Lotus you are using, it may be necessary to temporarily insert the Lotus System diskette in drive A, while the program starts.

When Lotus 1-2-3 starts running, the project impact spreadsheet loads automatically.

C. SAMPLE APPLICATION

1. This sample application assumes we are tracking a project (indicator) to dry corn using geothermal heat. Previously, we could dry 1000 pounds of corn per quarter. The target after five years is 10,000 lb per quarter.

2. A new project diskette is prepared by copying the Project Impact Diskette using the DOS DISKCOPY command. The Lotus program is then started up with this diskette as the data diskette. The data are entered as discussed in Section 2.1 of the instructions. The computer screen now looks like Figure I-1 on the following page.

3. The worksheet is set up for graphing using the [alt] S and [alt] T sequences as discussed in 2.1 of the instructions.

4. After the first year, the amount of corn dried each quarter is 1025, 1800, 2400, and 2700 pounds. These data are entered into the spreadsheet under the ACTUAL column. Figure I-2 shows the computer screen after these items have been entered.

5. The graphs are printed using the [alt] P sequence. Figures I-3 and I-4 are the graphs produced by Lotus for this spreadsheet.

Figure I-1. Sample Corn Drying Indicator:
Computer Display After Initial Inputs

F6: U 1000

READY

	A	B	C	D	E	F	G	H
1	PROGRAM IMPACT TRACKING SYSTEM							
2								
3								
4	DATA INPUT							
5								
6	BASELINE BEGINNING VALUE					1000.00		
7								
8	BASELINE VALUE BEFORE YR 4 (PY 1)					1000.00		
9								
10	TARGET VALUE AFTER YR 8 (PY 5)					10000.00		
11								
12								
13	YEARLY TRACKING DATA							
14								
15	PROJECT	CALENDAR	BASLINE	EXTENDED	PROJECTION		ACTUAL	
16	YEAR	YEAR		BASLINE				
17			VALUE	VALUE	%	VALUE	%	VALUE
18		0.00	1000.00	1000.00	10.0%	1000.00	10.0%	
19		0.25	1000.00	1000.00	10.0%	1000.00	10.0%	
20	BY1	0.50	1000.00	1000.00	10.0%	1000.00	10.0%	

Figure I-2. Sample Corn Drying Indicator:
Computer Display After First Year

H34: U 2700

READY

	A	B	C	D	E	F	G	H
21		0.75	1000.00	1000.00	10.0%	1000.00	10.0%	
22		1.00	1000.00	1000.00	10.0%	1000.00	10.0%	
23		1.25	1000.00	1000.00	10.0%	1000.00	10.0%	
24	BY2	1.50	1000.00	1000.00	10.0%	1000.00	10.0%	
25		1.75	1000.00	1000.00	10.0%	1000.00	10.0%	
26		2.00	1000.00	1000.00	10.0%	1000.00	10.0%	
27		2.25	1000.00	1000.00	10.0%	1000.00	10.0%	
28	BY3	2.50	1000.00	1000.00	10.0%	1000.00	10.0%	
29		2.75	1000.00	1000.00	10.0%	1000.00	10.0%	
30		3.00	1000.00	1000.00	10.0%	1000.00	10.0%	
31		3.25	1000.00	1000.00	10.0%	1450.00	14.5%	1025.00
32	PY1	3.50	1000.00	1000.00	10.0%	1900.00	19.0%	1800.00
33		3.75	1000.00	1000.00	10.0%	2350.00	23.5%	2400.00
34		4.00	1000.00	1000.00	10.0%	2800.00	28.0%	2700.00
35		4.25	1000.00	1000.00	10.0%	3250.00	32.5%	
36	PY2	4.50	1000.00	1000.00	10.0%	3700.00	37.0%	
37		4.75	1000.00	1000.00	10.0%	4150.00	41.5%	
38		5.00	1000.00	1000.00	10.0%	4600.00	46.0%	
39		5.25	1000.00	1000.00	10.0%	5050.00	50.5%	
40	PY3	5.50	1000.00	1000.00	10.0%	5500.00	55.0%	

Figure I-3. Sample Corn Drying Indicator:
Graphic Display of Values

Figure I-4. Sample Corn Drying Indicator:
Graphic Display of Percents