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An Example of  
The Costing of Primary Health Care:

Sine-Saloum

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My preceeding report to A.I.D. entitled, "The Costing of Primary Health Care" established the theory of cost and the methodology of what is cost. The central theme of the paper is that the term cost has no meaning in isolation, i.e., in isolation from its function. First, the function of the primary health care project must be determined before "the cost of" has any relevance. Second, the function of the cost estimate itself must be clarified. Whether the cost figures will be used for budgetting or for evaluating the project dictates differences in precision, data needs, and discretion on what should/not be included. Through our comparison and critique of empirical studies we saw how neglect in focusing on these two questions led to misleading cost figures. We saw however how ingenious some researchers were with the little data they could obtain.

This paper is a working example of the preceeding paper. Here, no attention will be given to the "why's" or to the development of methodology. Instead, the framework guidelines (pp.42-44) will be applied to the Sine-Saloum Project.<sup>1</sup> .

I: What is the function of this project in terms of:

- .goals and objectives of the project
- .scope, in terms of geography, population, and development.
- .inputs and utilization of existing infrastructure
- .outputs
- .duration

The stated objectives of the Sine-Saloum project are:(a) to establish a network of village health posts staffed and supported by community level personnel throughout the region; and(b) to improve

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<sup>1</sup>Information on the Sine-Saloum project comes solely from, "The Sine-Saloum Rural Health Care Project in Senegal", U.S.A.I.D. 1980, Project Impact Evaluation.

and strengthen the support infrastructure of the Government of Senegal for services to health centers<sup>2</sup>. The project is focused specifically on the Sine-Saloum region of Senegal and is to service the 880,000 rural persons in that area. The project has a four year stated duration although the real objective of the project is to "establish self-supporting Health Huts in 600 villages" <sup>3</sup>. Thus, project funding spans four years by which time it is anticipated that all Health Huts will be established and self-sufficient. (Those of you familiar with the Sine-Saloum project know the punch line: these Huts never became self-sufficient.)

From the stated objectives there is an implied multi-product output of this project. First, health care is to be provided to 880,000 rural inhabitants of Sine-Saloum. From the report, the nature and extent of health care to be provided is unclear. This is a serious flaw in project design. Second, a health care delivery infrastructure must be developed and this was to occur through the establishment of Health Huts. Third, not only was an infrastructure to be developed, it was to be self-supporting. In fact, each Hut individually was to be self-supporting. These outputs must be considered as one unit because taken separately there is no rationale for the use of Health Huts as the most cost-effective way of delivering health care to 880,000 persons nor was it established ahead of time that the effective demand of the population for health care was sufficiently great to enable these Huts to become self-sufficient.

II Will the project function as a pilot project or as an expansion project

No, the Sine-Saloum project is an "all-or-nothing" project in that it is neither a pilot project nor was it preceded by a pilot project. (This later point was mentioned in the evaluation report and one wonders how a project of this size and financial worth could be approved without a 'test run'!) Because the Sine-Saloum project will not be ex-

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<sup>2</sup>Ibid., p. 1 .

<sup>3</sup>Ibid., p. 1.

panded, the appropriate choice of accounting method is full-cost rather than differential accounting. Full cost involves accounting for all the resources used for a cost objective. This includes therefore both direct and indirect costs, i.e., costs that are specifically traceable to or caused by that cost objective, and indirect costs, or costs that are associated with or caused by two or more cost objectives jointly, but that are not directly traceable to each of them individually. With respect to labour costs, for example, both the quantity of labour time expended and the price per unit of labour time must be measured; the same holds for material costs.

### III: Which costs should be included

At this point, a distinction should be made between direct and variable costs. If the cost objective is a product, many costs that are direct to that product vary with the volume of output. Costs are labeled indirect if it is impossible or infeasible to trace them to a product or if management chooses not to trace them to a product. The calculation of indirect costs involves an allocation of costs incurred for several objectives. Just what the fair share of costs allocated to any one objective may be is related to a causal occurrence, e.g., a health care project that requires close supervision and heavy time inputs on the part of the Ministry of Health should bear a larger burden of the administrative costs than a less supervisory-intensive program.

One of the main complications in the costing of health care lies in the joint or multiple-product nature of the output. The problem of joint-costing is to find some reasonable basis for allocating to each of the joint products the costs that were incurred up to the split-off point in production. Inpatient costs might be allocated on the basis of hospital days per illness; outpatient costs could be allocated on the basis of diagnostic time required for the "clinical case" of the illness. In this way, some formula could distribute indirect costs in a standardized fashion.

With respect to the Sine-Saloum project the costing of a multi-product output is further complicated by the fact that the products produced are so diverse; health care(it-self a multi-procuts), a health infrastructure, and self-supporting business operations.

While full cost accounting is most useful in answering the question "what did it cost" it should be noted that if some of the production costs are indirect, the full cost of an objective cannot be measured with complete precision. In other words, there can be as many cost estimates as there are accountants. Discretion arises with respect to the following:(1) capital versus product costs;(2) the measurement of direct costs,i.e., are records kept in the same fashion in various projects. (Here the Sine-Saloum project made a concerted effort to hire individuals who would comply with an accounting uniformity; this led to a poor choice of personnel when viewed under leadership criteria.); (3) the distinction between direct and indirect costs; (4) alternative allocation methods; and (5) assorted overhead measurement allocations.

#### IV: The Breakdown of Direct and Indirect Costs

The first breakdown of cost therefore occurs between direct and indirect costs. Grosse et al(1979) introduces a further division. This consists of:

- (1) variable investment; one-time costs related to type and volume of acti
- (2) fixed investment; one-time costs independent of the volume of activities ultimately to be achieved
- (3) fixed operating; operating costs related to the time/duration of activities, but not to their volume
- (4) variable operating; operating costs related to the duration and the volume of activities.

The following illustrates the breakdown:

COSTS	
DIRECT	INDIRECT
<u>One-Time</u>	
1.Variable Investment	
2.Fixed Investment	
 <u>Recurrent</u>	
1.Operating	
2.Variable	

V; Recurrent Costs

The terminology of recurrent costs has been used above without proper introduction. The function of a project in terms of time adds another dimension to cost figures. The time dimension ushers in an expanded concept of cost that must differentiate between period costs and multi-period or continuous costs. This expanded dimension of function alerts us to program maintenance and operational costs over time. Clearly not all of a program's costs will be recurrent, but those costs which will be recurrent must be costed on a continuous basis.

This opens the door to numerous problems. First, how should the program account for these recurrent costs? Various alternatives exist: (1) The recurrent costs can be earmarked and projected over the life of the project and then, through the use of an acceptable social discount rate, the present value of this cost stream can be calculated. (Obviously this procedure requires much computational time and many 'educated guesses'.); (2) Heller (1979) suggests calculating an "r" coefficient for projects where "r" is merely a ratio of the project's net recurrent requirements to the total investment outlay. This would quickly alert administrators to the nature of the project and the

span of the financial commitment; or (3) Expenses for one year can be calculated and recurrent expenses merely flagged in some respect. While this alerts administrators and evaluators to recurrent costs, it eliminates the discounting of the continuous stream of future recurrent costs.

The absence of identification of and inclusion of recurrent costs in the Sine-Saloum project was one of the main reasons for project failure. As already mentioned, one function of the project was to establish self-sufficientHuts; to do thus, calculations concerning Total Cost and Total Revenue were essential. Examination of the above Table alerts the reader to the seriousness of ignoring recurrent costs when estimating the total costs of the project.

A further disaggregation of the above Table could facilitate accountants, administrators, and evaluators.

TABLE 2

	ONE-TIME		RECURRENT	
	DIRECT	INDIRECT	DIRECT	INDIRECT
<b>1. Personnel</b>				
. personnel directly related to the provision of services				
physicians	Salary*	Initial	Salary *	Replacement
nurses				
midwives	Recruitment	Preparations	Allowances *	Training
health workers				
others				
.Administrative/ Government personnel (by definition, these personnel are indirect to the project itself)				
support staff		Salaries Bldg, or capital expansion to facilitate increased workload	on-site visitations direct inter-action with Sine-Saloum	% of time allocated to Sine-Saloum project vs. other projects

ONE-TIME

RECURRENT

DIRECT

INDIRECT

DIRECT

INDIRECT

2. Facilities

<ul style="list-style-type: none"> <li>. Health Huts</li> <li>. living quarters for personnel</li> </ul>	<p>existing facilities new purchases</p>	<p>expansion of materials mkts to facilitate inputs</p>	<p>Rent Maintenance</p>	<p>Acquisition of maintenance equipment used more than one project</p>
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3. Land

<p>existing owner- ship new purchases</p>	<p>convincing neighbors of desirability of location to Huts</p>	<p>Rent</p>	<p>Upkeep/ Maintnenace</p>
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4. Vehicles

<ul style="list-style-type: none"> <li>. Horse and buggy</li> <li>. cars</li> </ul>	<p>new purchase * new purchase *</p>	<p>special order</p>	<p>food, vet care gasoline * maintenance *</p>
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5. Medicines

<ul style="list-style-type: none"> <li>. vaccines</li> <li>. drugs</li> <li>. food supplements</li> <li>. laboratory equipment and supplies</li> </ul>	<p>initial stocks *</p>	<p>transportation to Hut</p>	<p>recurrent purchases</p>	<p>transportation to Hut, maintenance supplier and delivery system . cotton, gauze, et</p>
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6. Communication and Evaluation

<ul style="list-style-type: none"> <li>. personnel</li> <li>. vehicles</li> <li>. fuel</li> </ul>	<p>salary training data visits</p> <p>new purchase</p>	<p>search time competent drivers</p>	<p>salary visits *</p> <p>maintenance</p> <p>purchases *</p>	<p>road infra- structure must b maintained</p>
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The above is a simplified outline of the breakdown of a project's costs into one-time, recurrent direct and indirect categories on the basis of function. Asterisks denote information contained in the Sine-Saloum report. It is obvious from the small number of asterisks that little costing of this project was undertaken. The most serious and constant omission occurs on the far right hand side of the Table, i.e., the recurrent cost category.

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#### VI: Cost Calculation for Evaluation Purposes

It was stated above that cost is defined in terms of two functions. The first function, the function of the project, has been analyzed above. The second function is however with respect to the function to be served by cost numbers themselves. We have partially answered this function already in noting that the cost is not to serve the role of projecting pilot project costs to an expanded project. But, how are these cost numbers to be used? The above numbers can be used for the budgetary process, but further data must be collected for project evaluation.

The Sine-Saloum report is, in fact, an evaluation report that is remarkably devoid of any quantitative evaluation of the project. In part, this arises from the lack of a clear and measurable goal of the project. From mere observation of Health Hut closings it is obvious that one of the functions, i.e., "to establish self-sufficient Health Huts" was not fulfilled. But, this was a project that produced a multi-product. How well did it produce these other products?

In the background information illusion is made to Health Posts, as opposed to the Health Huts of the current project. Neither their function, staffing, or provision of services is explained, compared, or contrasted to the Health Huts. What does appear in the report (p.H2 ) is a table indicating to what extent Health Huts have taken customers away from the Health Posts.

The preceding paper, "The Costing of Primary Health Care", gives the strengths and weaknesses of alternative evaluation methods (see p.37 since one of the functions of the Sine-Saloum project was to create an infrastructure, cost-benefit analysis is inappropriate and would in fact give misleading results. What could be undertaken however is some form of cost-effectiveness evaluation. Since Health Posts already exist in Sine-Saloum, why not compare their cost-effectiveness in delivering health care to that area of Senegal with the cost-effectiveness of Health Huts.

#### VII: Cost-Effectiveness

One difficulty in cost-effectiveness evaluation is controlling for the multi-product nature of primary health care. In our case, no such problems arise. First, Huts and Posts (as evidenced by p. H-2 ) give the same type of services as indicated by cases treated. Second, the inputs, i.e., the patient-mix is the same for the two. Geography, income, travel time, general environment are controlled for. Thus Huts and Posts receive approximately 'the same' patients.

Costs to be considered for such a cost-effectiveness measure are those listed above plus any and all costs incurred by the patient. These include: fee-for-service, transportation costs, work loss due to travel and waiting, and imputed inconvenience costs (to account for waiting time differences). If either the Huts or Posts on-site train personnel, then the cost of such training must be deducted from the cost of providing care. If such training costs were not deducted then the two programs could not be compared on the basis of their cost-

effectiveness of providing primary health care, but rather that one provides primary health care and one training plus primary health care.

Likewise, the Health Huts must calculate ( and in some cases impute) the cost associated with "establishing a health infrastructure" as opposed to providing primary health care. Of course, if both Huts and Posts are establishing such a health infrastructure, then such a subtraction need not occur.

The following steps provide guidelines for cost-effectiveness analysis:  
(1) What is the stated goal/objective of the project?

The given end of a project is stated and costs are compared with respect to that given end. Many health care evaluations have compared cost per patient or per case. This mistake indicates a lack of understanding of the underpinnings of cost-effectiveness analysis.

(2) What are the costs to be included?

These have been discussed in detail above. Now, however, a patient's direct and indirect costs must be included also. Only costs that have been incurred with respect to the stated goal should be included. For example, if the cost-effectiveness of Posts and Huts with respect to delivering primary health care is to be compared then any costs incurred that do not (either directly or indirectly) arise from the primary health care function should be subtracted. Thus training and infrastructure costs are not included, but differences in patient waiting time (measured in CFA) or transportation costs are included.

The data-base needs for a cost-effectiveness analysis are not extensive. The above table needs to be filled in; this would require a minimum amount of effort by the supervisors. Data with respect to population covered by Huts and Posts must be gathered (preferably by interview or survey) and individual patient information must be obtained. The patient information can be obtained as care is given; charges, transportation cost, and other indirect cost information is necessary.

If it is unclear that Posts and Huts serve the entire Sine-Saloum region, then various observation points can be picked where a Hut and Post operate near each other and service the same population/area. Obviously the latter is not the preferred case, but it certainly is preferable to the absence of evaluation in the present report.

Project evaluation should be alerted to both the lack of data in cost estimates of projects and the lack of thought on project evaluation. At the same time that data is being compiled for the budgetary process data can be compiled for the future evaluation. At the same time, thought should be given to the patient data base. If survey, interviews, or personal records are to be kept, the incipient project should make allowances for this.

Since the Sine-Saloum project did not intend to function as a pilot project, evaluation criteria concerned with project expansion (be it on a coverage-basis, population-basis, or both-basis) was not considered in this work. Variance analysis, economies and diseconomies of scale, and macro versus micro-economic implications must be considered. (See Gaspari, "The Costing of Primary Health Care" for more information on these topics.) Obviously the question of financial stability of the project is composed of two halves: (1) What does it cost; and (2) What are the sources and extent of funding. This paper sought to provide some guidelines on the first question only; the Sine-Saloum project failed to adequately answer either question.

#### VIII: Conclusion

Neither this paper nor the "parent paper", "The Costing of Primary Health Care", could provide any actual numbers. Both papers sought to provide the health planner and project evaluator with a conceptual framework that would lead to a logical ordering of priorities, considerations, and aspects of the cost estimates

that should be considered, included, or questioned. I anticipate that many readers will be disappointed by the lack of numerical benchmarks in these two works. Because of this, I would like to devote the conclusion of this paper to an explanation of this "deficiency" and to safeguard the evaluator against such benchmark estimates.

What is primary health care? Although definitions can be given, there is no universal meaning to the term. Some of A.I.D.'s projects focus on comprehensive care and some on basic care. Obviously, here is the first first divergence in cost. Basic health care is much more limited in scope, objective, and duration. Comprehensive care is none other than "the development concept in the guise of health care". To predict the costs of this type of health care would be to project the cost of the development process itself.

By the same token, it is impossible to calculate the costs of projects that have as their endpoint two divergent definitions of population. Some projects are pilot projects, some are national in scope, some are regional. The concept of "cost per individual" is not invariant to the endpoint of the project! Rather projects should be grouped by the range and scope of coverage and costs could be compared within those groups.

Must the project develop an infrastructure before it can begin to function, or can it draw upon the existing infrastructure? Does a Ministry of Health exist? Is there transportation to the target population? Do input markets exist for drugs, materials, personnel? Obviously, if such infrastructures do not exist, they must be first developed before the project can begin to provide primary health care. This brings up the next point.

Is the primary health care project to produce just health care, or is it to produce intermediate products? Will drugs, facilities, doctors, nurses, paramedics be produced by the project and then used within the project? OR Will the project buy

these inputs directly? (If they are bought directly are they imported, produced at home, or donated?) If the inputs are to be produced within the project then all the concepts of cost and production must be applied to these goods also.

What does the population look like? Here those demanding health care must be considered, for this dictates the cost of health care. If the health care needs of the population are easily satiated, then the project may incur low costs. Over time however, the needs of the population change. Population growth, demographics (especially emigration, and immigration), socioeconomic factors affecting the prevalence of disease will affect the type of care that the health care unit is to provide. Thus the function of the project may remain the same and yet the cost of fulfilling that objective may change dramatically as the population changes. The astute evaluator should ask the project planner to "think through" this concept of evolving needs and the effect it will have on the project.

The above has sought to explain the differences that exist in health care projects. The evaluator/planner need not "rediscover the wheel" with each project however. Given the increased number of health care projects in recent years, many "like" projects can be found. It is anticipated that perhaps over time a catalogue of comparative studies could be compiled. "Like studies" would be alike on the basis of: providing similar care; duration; similar population; and comparable stages of national economic development. Within these groups evaluators can compare costs of coverage, success and failure, and learn from past budgetary mistakes.

The evaluator should develop a standard list of questions to ask of each project. Questions should fall in the category outlined in this paper and costs can be divided as they are in Table 2. In this way some systematic form of evaluation can be applied to all projects.

In short, there is no short cut to a detailed evaluation of each project. No "cut-off" numbers can be given and none should be applied. Evaluators must develop a logical framework for the evaluation of

projects. The two papers that I have authored for A.I.D. have presented in varying detail this logical framework. In conclusion, I must add that there is no short-cut to the thinking process - the use of "short cut" numbers can lead to a severe misuse of health care resources.