



**REACH**

RESOURCES  
FOR CHILD  
HEALTH

## TOWARD ENSURING THE FINANCIAL SUSTAINABILITY OF EPI

Discussion paper prepared for the  
World Health Organization  
Global Advisory Group on the  
Expanded Programme on Immunization (EPI)

Cairo, Egypt  
October, 1990

by

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## ACKNOWLEDGEMENTS

This paper was prepared under the REACH (Resources for Child Health) Project. REACH is a project sponsored by the United States Agency for International Development, Bureau for Science and Technology, Office of Health (contract number DPE-5982-Z-00-9034-00) and managed by John Snow, Inc. (JSI), located in Arlington, Virginia. Several individuals have been helpful in formulating and developing ideas and recommendations that appear in this paper. Foremost among these has been James Cheyne, WHO/Geneva. Additional valuable input has been provided by Robert Kim-Farley, WHO/Geneva, Connie Carrino, AID/S&T, and by the staff of REACH (Pierre Claquin, Susan Grantham, Diane Hedgecock, Norbert Hirschhorn, Logan Brenzel, Gerald Rosenthal, Allison Percy, Mike Favin, Robert Steinglass, Mary Harvey, and Jack Fiedler). Several other individuals among donor and technical agencies shared their views and experiences, providing a wealth of information used as background for this paper. While the assistance of all of these individuals has been extremely valuable, the views and recommendations presented in this paper are the sole responsibility of the author.

## I. OVERVIEW OF ISSUES AND OBJECTIVES OF THIS PAPER

There is no question of the need to sustain the tremendous progress of EPI. "Sustainability" comprises at least three essential elements of sustainability. The first involves the technical sustainability of EPI through improved efficiency and cost-effectiveness of EPI. The second element is socio-political sustainability, which comes from strengthening political will and community desire for EPI. The third element, which is addressed by this paper, involves finding steady and sufficient funds to pay the costs of EPI.

To help guide efforts towards EPI's sustainability it is essential to have a common understanding and agreement on one main point: How important is sustainability? Is it more important for EPI to be sustainable by a developing country with its own hard currency, or is it more important to increase coverage levels or add new interventions? Should EPI be pursued at any cost? Answering these questions will take advisory groups, planners, and decision-makers a long way toward developing consensus about a strategy of financial sustainability, and toward identifying steps to reach that end.

The purpose of this paper is to identify some simple financial strategies to help ensure that the essential gains of EPI can be sustained, to maximize EPI's investment value, and to safeguard against any potential vulnerability to a future resurgence of diseases that are now well on the way to being controlled. This paper does not argue dogmatically that financial sustainability is more important than technical improvements in EPI, but it does argue that continued expansion and improvements into the 21st century must be made within a financial framework that ensures that EPI's gains are not vulnerable to reversal. This framework addresses both national and global financial sustainability. As a point of departure, three simple recommendations are made to develop a strategy for achieving financial sustainability. (1) Support should be allocated based on both need and investment value (that is, the long term returns which are expected from the investment in EPI). (2) A long-term financing strategy for EPI should be included along with the technical strategies for EPI. (3) The definition of roles for donor agencies, technical agencies, and developing country governments should be improved to facilitate working towards the financial sustainability of EPI.

## II. BASICS OF FINANCIAL SUSTAINABILITY

Though the concept of sustainability is relatively simple, achieving it at any level (local, national, or global) is quite difficult. One reason is that the economies of many developing countries are not in good shape. A more important reason is that EPI and its interventions have tended to become ever-more complicated and costly, while the public-sector budgets of developing countries have been shrinking in real terms (i.e., adjusting for inflation). Targets become more ambitious, embracing universal coverage and new interventions. More ambitious objectives and strategies pursued by EPI often outstrip the ability of developing countries to carry out EPI without commensurate increases in technical and financial support. While donor and technical agencies contribute a great deal to the resources available for EPI, such international assistance also increases the cost of that equation by introducing more expensive targets, as will be discussed in more detail below. In uncertain economic environments, the sustainability of more complex and costly strategies at the national or global level simply cannot be assumed.

Even if donors, technical agencies and developing country governments were committed to continuing support for EPI, it may not be helpful to EPI's long-term sustainability to assume that external financial support will continue to grow as indefinitely. Several basic economic considerations are beyond the control of both donor agencies and ministries of health. Because of this, measures to improve sustainability may be essential to prevent the recent gains of EPI from being lost in an uncertain future.

Sustainability involves an underlying process whereby a set of institutional, financial and social mechanisms enhance and ensure continuation of outcomes at various levels. There are clearly many indicators and strategies for sustainability. Some of these are:

- Strengthening integrated primary health care services
- Enhancing the ability of developing countries to pay recurrent personnel and non-personnel costs
- Developing "bundled" approaches in which EPI costs can be recovered from other activities such as sales of drugs
- Developing political will in developing countries to continue donor-funded programs after external funding is discontinued
- Increasing consumer demand for immunization
- Developing self-sufficiency for carrying out EPI, in institutional and financial aspects, including hard currency requirements
- Encouraging long-term commitment on the part of donors
- Realigning international economic relations to reduce the current financial burden on developing countries

All of these characteristics are valid as criteria by which to assess sustainability. That is, each addresses some property, condition, or determinant of sustainability, and all fall into either the technical or the financial sets of sustainability criteria. Each emphasizes different aspects of sustainability, and the choice of a "best" definition depends upon which issues are of the most immediate interest and which are most important and relevant to policy makers, and of course whose perspective is being taken (be it that of a donor, a technician, or a ministry of health official). It is important, therefore, to focus this discussion by defining the specific aspects of financing and sustainability being considered here.

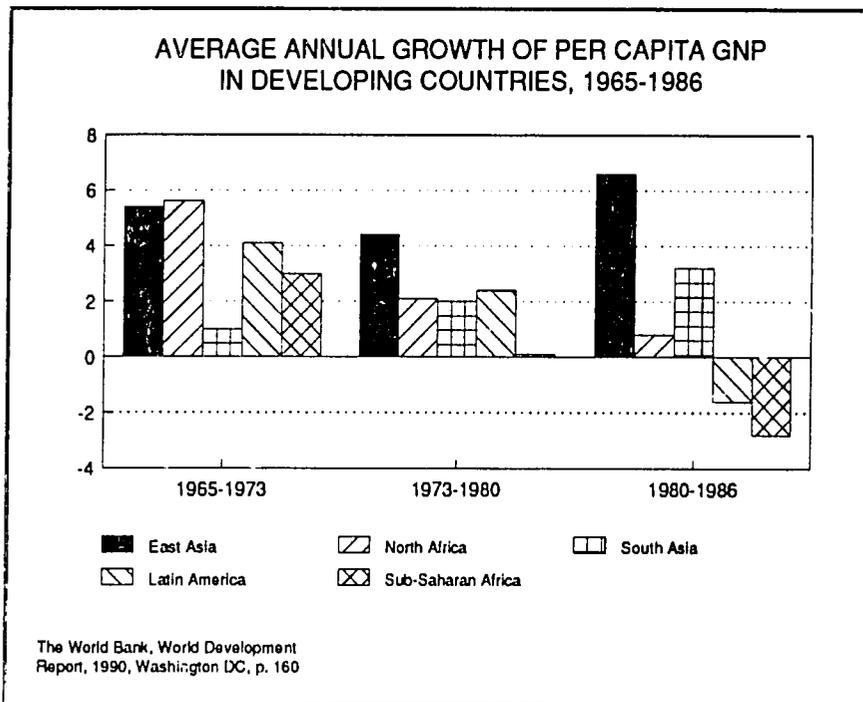
Financial sustainability of EPI is the ability of an integrated public health system to generate and allocate a sufficient level of resources (national and external) for immunization activities to sustain an acceptable level of coverage. Financial sustainability also involves the ability of national governments to dedicate sufficient resources to pay the costs of reaching immunization objectives. The objective of a sustainability strategy is to maximize the long-term investment value of those financial resources available to EPI from international and national sources. This involves marshalling more internal resources for a country's EPI and taking measures to ensure the reliability of these resources, while donors (bilateral and multilateral) maintain those essential parts that a country cannot reasonably be expected to pay for, in such a way that the essential components of EPI can be maintained under any circumstances.

It is crucial, within the framework of a sustainability strategy, not to overload EPI. EPI can only be sustainable in the long run if it is affordable at the global and national levels. Inputs from donor and technical agencies must be applied in such a way that technical strategies of EPI do not outstrip the ability of developing countries to thoroughly absorb the technical, human-resource, and financial capacity to sustain EPI. It is expected that EPI will continue to expand and improve in a linear fashion, but great increases in coverage and acceleration that are not sustainable do not further the long-term objectives of EPI. New and more costly components of EPI should be undertaken only when the sustainability of the structure of EPI (i.e. the ability to independently carry out essential activities at an acceptable level of coverage) has been achieved and can be assured.

### III. THE ECONOMIC CONTEXT OF SUSTAINABILITY

Economic Performance. During the 1970s economic development projections were optimistic amid expectations of the replicability of "the Korean miracle" and other such paradigms, and talk of the "take-off stage of economic development." It is now widely known that during the 1980s the economic performance of many developing countries fell well short of such expectations. Many countries saw very little growth in real per capita terms; most experienced actual decline, as shown in Figure 1. With continuing population growth, rising energy prices, and unstable economies, there is ample reason to take recent economic history into consideration when projecting the availability of financial resources.

Figure 1



It is also widely recognized that social-service sector budgets, particularly health budgets, have been especially hard hit. In countries with substantial public debt, the health sector is especially vulnerable to declining resources. For example, a recent analysis of the relationship between public debt and health expenditures (based on data from 50 countries) shows that, on average, every \$1 million of public funds used for debt servicing translates into a 1% decrease in the share of the public budget allocated to health. While this study did not address the specific impact upon EPI expenditures, it does demonstrate that the health sector is more vulnerable to the impact of public debt burden than other sectors.<sup>1</sup> Furthermore, some activities within public-sector health budgets suffer more than others when cuts are made. For example, the proportion of funds allocated to personnel has risen steadily, even with sharp cuts in funds for transport, supplies, maintenance, and other support activities, all of which potentially can affect EPI expenditure patterns.<sup>2</sup> Such trends underscore the importance of strategic thinking to ensure the financial sustainability of EPI.

Prospects for developing countries are not expected to improve dramatically in the 1990s. The debt burden, especially in Latin America, will slow the rate of economic recovery as debt servicing continues to consume a substantial though falling proportion of GNP. In addition, economic restructuring in the previously centrally planned economies of Eastern Europe can be expected to strain the international credit system further, and eventually to increase competition for the export sectors of developing countries.

Cost considerations. In the real world of limited resources, decisions about how to spend resources are not made solely on the basis of cost-effectiveness (indeed, consideration of cost-effectiveness may not even enter into the decision making process). Absolute costs are of concern as well, for the absolute level of available financial resources is a binding constraint. Within national and international budgets, EPI must compete with other important health interventions and other development activities. While decisions are made at the national and international levels about resource use, those involved in advocacy and resource planning for the health sectors in developing countries have come to realize that Health for All is a very costly proposition. When considering the costs of EPI, it is important to consider the characteristics of those costs. These characteristics include cost effectiveness

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<sup>1</sup> See Jack Fiedler and Laurence Day, The Relationship between Public Debt and Health Expenditure, REACH Technical Note (Arlington: REACH/JSI, 1990).

<sup>2</sup> A recent REACH study found that in 31 countries for which data could be obtained, personnel accounted for an average of 60-70% of MOH recurrent expenditures over the period 1978-89, and for this period there was an average increase of nearly 20% as a percentage of total central government health expenditures. This proportionate increase came at the expense of drugs, supplies, fuel, maintenance, and other important inputs. Personnel tends to be more resistant to budgetary cuts, owing to strict labor laws and often inefficient human-resource management. Personnel also tends to have regular built-in increases such as indexed pay raises and "job creep" through career advancement and promotions; this process is also typical of other public sector budgets. Specific impact upon EPI expenditures was not addressed in this study. See Jack Fiedler and Laurence Day, Trends in Ministry of Health Personnel Expenditures, REACH Technical Note Series; (Arlington: REACH/JSI, 1990).

(i.e., the relationship between costs of EPI and the benefits which result from EPI), variability of costs (i.e., which factors affect costs), aggregate costs (the sum total or absolute costs), and affordability (i.e., the availability of resources and the ability to use those resources for EPI activities).

Cost Effectiveness. It is usually more cost-effective to prevent a disease than to cure it. Diseases that can be prevented by immunization are costly, for they lead not only to treatment costs but also to long-term malnourishment, disability, and foregone productivity. Immunization is assumed to be one of the most cost-effective health interventions available for preventable diseases. Every completed immunization produces a lifelong stream of benefits through on-going prevention of the targeted disease. In short, the cost of not immunizing is far greater than the cost of immunizing.

Variability of costs. EPI's costs are highly variable and influenced by many factors. The most obvious factor in the cost of EPI is the level of coverage. The technology being applied, in the form of different methods of delivery or different packages of immunizations, also directly affects the cost per fully immunized child (FIC). Several factors influence the cost variability of a national program or of a specific strategy, including:

- the ratio of fully immunized child to partially immunized child within the population
- the size and distribution of the population
- the number, type, and productivity of personnel
- the effective organization of personnel and equipment
- the type and durability of materials and supplies, and the appropriateness of technology
- strategies pursued, such as acceleration of elimination of missed opportunities

At least two other factors determine minimum long-term costs. One is the nature of communicable disease control: with communicable diseases that are unlikely to be eradicated as smallpox was, immunization must be continued with future cohorts to control epidemics. Measles is a good example of this, as industrialized countries, with high coverage rates, still have occasional outbreaks of measles. The need to immunize against these diseases, and the concomitant costs of this immunization, will not go away in the near future. A second factor is the rate of population growth. The number of children requiring immunization will continue to grow in countries according to their rate of natural increase (typically 2% per year or higher). Even if all per-child costs of EPI were held constant, with no increases in coverage or new interventions, the costs would continue to grow at a rate roughly equal to the rate of natural population increase.

Between 1985 and 1990, national immunization programs undertook acceleration programs and strategies to increase coverage toward the target of 80% coverage by 1990, and donor organizations contributed substantial financial and technical resources toward this effort. During this period, the cost and cost-effectiveness of national programs and alternative strategies were evaluated. With the high level of donor support in the programs

reviewed, the average cost per fully immunized child increased slightly to \$15, ranging from \$4 to \$19. Only small differences in average cost existed between strategies (Table 1 in the Appendix summarizes the results of a review of cost-effectiveness studies of EPI.)<sup>3</sup>

Aggregate costs. Simply extrapolating cost estimates to a global level, the costs of 90% coverage of EPI for a one-year cohort of children in developing countries would equal perhaps \$1.5 billion. If this coverage is calculated only for those countries with a high or very high infant mortality rate (IMR >95:1000), the annual cost would be perhaps US\$ 834 million.<sup>4</sup> Of course, these estimates are on a gross order of magnitude; they are presented merely to help size up the task of the financial sustainability of EPI. Considering that future increases in coverage are all but certain to be more expensive, this estimate is, in all likelihood, low.

Data on total current expenditures are extremely difficult to obtain. Nevertheless, a survey of most major donors, as well as technical agencies and developing country governments, can provide some estimates of funding levels on a gross order of magnitude (see Table 2 and Table 3 in the Appendix, which summarize data from those agencies providing information). This survey suggests that, while funding increased substantially over the past several years, the level of funding from individual sources, and the funding available to multilateral agencies and for individual recipient countries, tend to vary greatly.

Affordability: Affordability can be defined as the realistic ability of a developing country to pay for EPI, based on its financial or budgetary profile, gross domestic product (GDP), or other measures. Given what is known about costs and about macroeconomic indicators, and by making some assumptions about growth rates and about public-sector allocations to EPI, the affordability of desired levels of coverage can be estimated. This

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<sup>3</sup> One major gap in current knowledge is that it is not known, on a cost basis, what the optimal levels of coverage are. There are no clear analytic models which base optimum coverage rates or mixes of strategies on cost data, so as to allow specific and absolute recommendations based on cost criteria. It is widely believed that a normal, U-shaped cost curve characterizes immunization service provision (Dale Hu, "A Methodological Framework for Analyzing Effects on the Cost per Fully Immunized Child", Geneva: WHO, 1990.) This means that, when coverage levels are very low the cost per immunization under a given strategy is relatively high; the cost per immunization (the average unit cost and the marginal cost) decreases thereafter, up to some level of immunization. After that point, the cost per child increases again, owing to the rapidly increasing logistics and other managerial difficulties involved in providing more services beyond that optimal level or in reaching the last 5-10%. In reality these cost functions may follow some different cost curve, perhaps an S-shaped curve as different stages of coverage are attained. Actual data on cost functions are currently under analysis by REACH and may soon be available.

<sup>4</sup> Estimation based on (a) total number of children under five, (b) a one-year cohort assumed to be 20% of the children under five, (c) coverage assumed to be 90%, and (d) cost per FIC to be \$15.00. Including high and medium IMR countries (total population of 541 million children under five), the estimate is about \$1.5 billion.

exercise was carried out recently by economists under the REACH Project.<sup>5</sup> The results provide some important findings. They indicate that independent financial sustainability will remain beyond the reach of many countries, especially in Africa and Asia, for decades to come, even if a very high rate of economic growth is assumed and even if these countries were to devote an unrealistically high proportion of their GDP to EPI (more than 0.2% - 0.3%). Though many of these countries currently pay some portion of the costs of their own EPI, independent financial sustainability for some of them would require expenditures equal to the total amount spent on primary health care. Some of the very poorest countries were not included in this analysis because of insufficient data; if included, they would certainly increase the number of countries that cannot be expected to pay for EPI with their own resources. Furthermore, this analysis was based on costs of 80% coverage of the six EPI antigens. Higher coverage rates or additional interventions would increase costs and reduce the ability of these countries to achieve independent financial sustainability. The figures on the following two pages provide examples of this analysis. Figure 2 shows the level of immunization coverage which can be expected in developing countries by the year 2000, if 0.1% of GDP is devoted to EPI. For another way of looking at the affordability of EPI, Figure 3 projects the number of years from 1990 it is expected to take countries to be able to attain 80% coverage with their own resources.

In light of these projections, it is essential to realize the importance and the inescapability of tradeoffs. It is known that, given real resource limitations, many countries cannot be expected to fully sustain acceptable levels of immunization, even without increasing coverage or adding new interventions. Extending coverage or adding new elements to the EPI package (such as vitamin A or hepatitis B for each child, or tetanus toxoid for all women of childbearing age) always increases the benefits as well as the costs. However, these strategies cannot be accomplished in the longer run without either (1) reducing the average costs (per FIC) of EPI interventions and/or (2) garnering more resources from international donors or local resources. In other words, extending EPI coverage or adding to the standard EPI package will not be financially sustainable in the long term without increases in the level of financing and/or the efficiency of EPI service delivery.

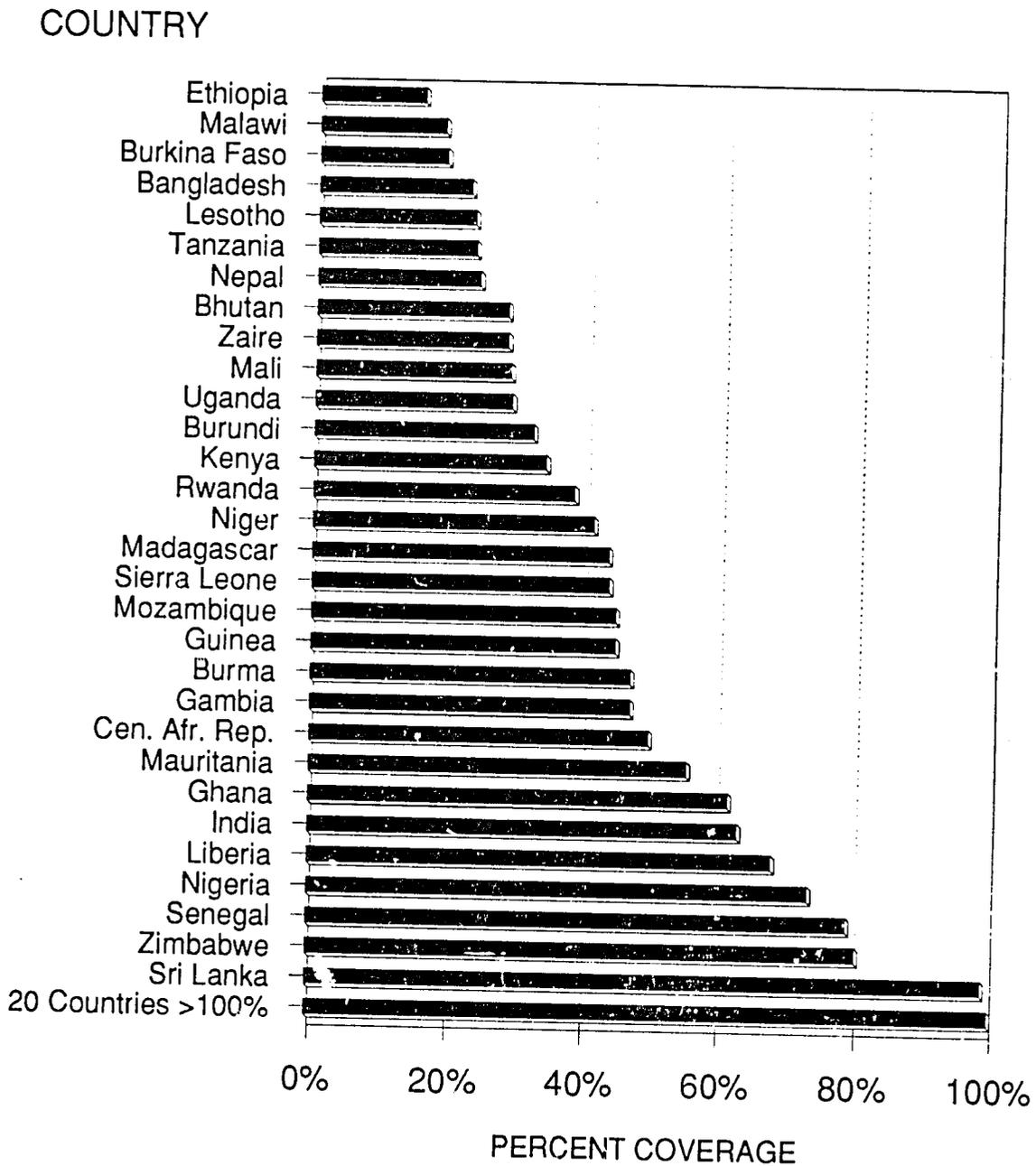
In principle, there is no fundamental problem with increasing the costs of EPI, so long as the benefits always exceed the costs and someone is willing to pay those costs. Indeed, the donor community appears to be willing to support EPI. There is little hard evidence of universal donor fatigue when it comes to EPI, though some countries have reduced their level of support. Notwithstanding such commitment, the concern addressed by this paper is that the US\$ 15 or so spent per FIC, though a very cost effective public health intervention, does not have the maximum possible impact on the long-term financial viability of global and national level EPI. The benefits for the individual are lifelong, but the benefit to future cohorts may be unaffected by this approach. This is of particular concern because, as discussed above, there simply cannot be certainty that constantly increasing levels of funding can be provided. Macro-level strategies designed by technical agencies, such as campaigns or acceleration, may make EPI less sustainable because they increase their costs. It is essential

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<sup>5</sup> For a complete description of this analysis, see Gerald Rosenthal, Immunization Sustainability Study (Arlington: REACH/JSI, 1990) and The Economic Burden of EPI (Arlington: REACH/JSI, 1990).

Figure 2

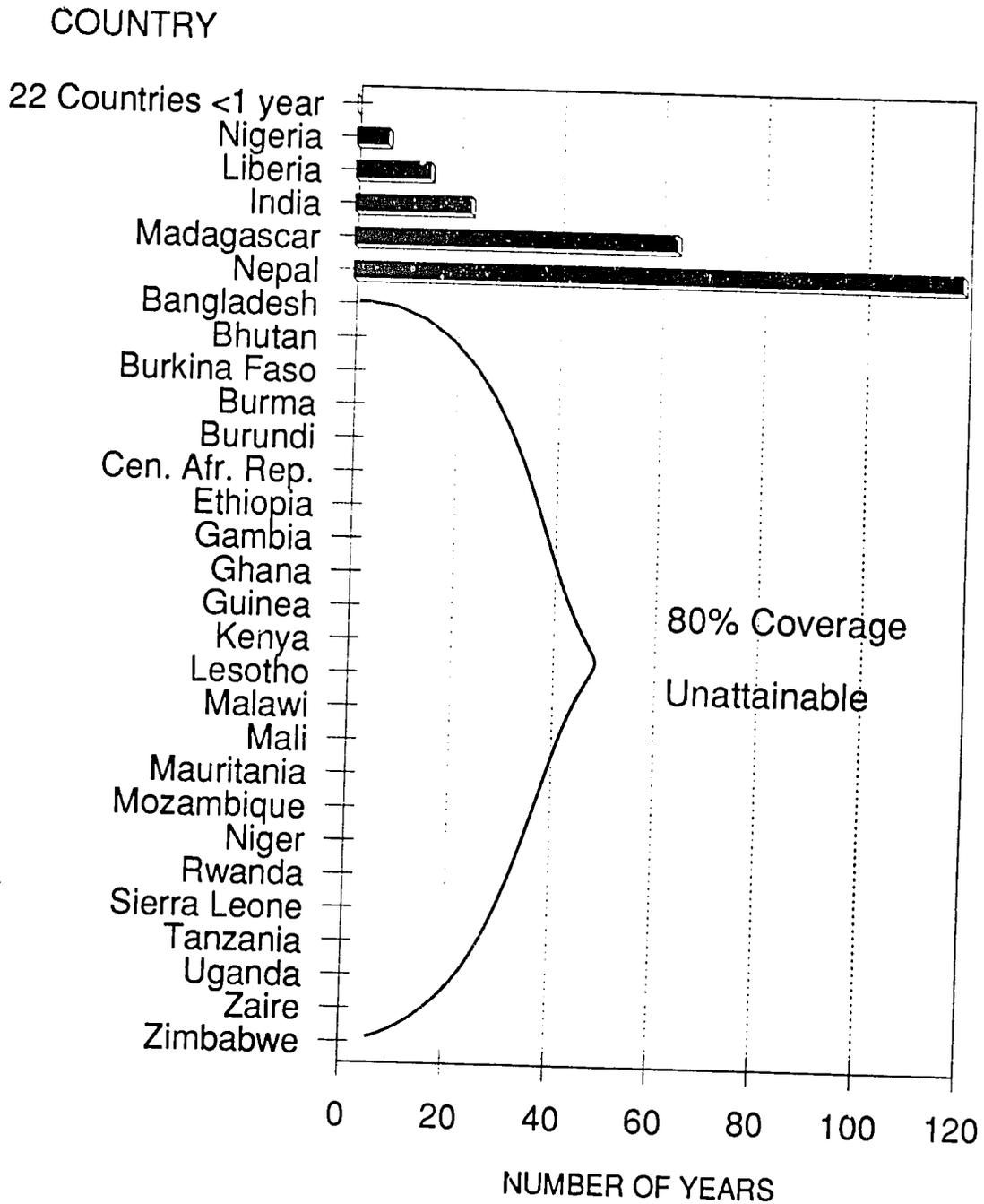
IMMUNIZATION COVERAGE ACHIEVABLE  
WITH EPI EXPENDITURES OF 0.1% OF GDP  
BASE GROWTH SCENARIO - YEAR 2000\*



\* Cost per FIC = \$15

# Figure 3

## NUMBER OF YEARS FROM 1990 TO ATTAIN 80% COVERAGE BASE GROWTH SCENARIO



These projections show the number of years an EPI budget of 0.1% GDP needs to meet the cost of immunizing 80% of the target population @ \$15/FIC with the GDP growth rates of each scenario. As the GDP growth rate increases, the number of years required for 80% coverage goes down.

that international and national efforts support financial sustainability objectives, in order to ensure that the fundamental elements of EPI can be sustained far into the future. Investment must be made to enhance future capabilities and performance of EPI, not only current objectives which reach a cohort of direct beneficiaries.

#### IV. CURRENT ROLES IN EPI

Developing countries have demonstrated their commitment to continuing EPI activities through vertical programs or as an integrated part of their public health service. But this does not mean that donors and ministries of health will be able to increase financial support for prolonged strategies of high coverage or a more complete set of interventions. Even with technical improvements in the effective production, distribution, and application of immunizations, and even with improvement in the public financing of EPI, some tradeoffs must be considered.

Donor Agencies. Within international development portfolios, EPI has traditionally had high priority among donors. Economic, public health, and moral arguments for protecting children from preventable diseases through cost-effective immunization have generally prevailed. As a result, current international support for EPI is such that no other health activity receives a greater proportion of its resources from international donors. In a study of 23 countries, donors paid for approximately half of the costs of EPI and developing countries paid the remainder.<sup>6</sup> International support from donor agencies has continued to grow despite economic difficulties. Foreign assistance worldwide is now at an all-time high, as is international support for EPI.

Bilateral and Multilateral Technical Agencies. While economic difficulties in many developing countries have led to a decline in the public-health sector, EPI can boast of tremendous successes. With the technical and financial resources of international agencies and the determination of developing country governments, immunization levels worldwide are at the highest levels ever. There is also the advent of new technologies, which could bring additional preventable diseases within the practical range of EPI. Again, these improved strategies and technologies may be justifiable in strict cost-benefit terms (or, for the newer interventions, this will be the case if prices drop according to expectation). Nonetheless, the pursuit of these additional objectives with their added cost can only come at the expense of other objectives, including "sustainability."

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<sup>6</sup> This study of seven countries estimated that 69% of the costs of mobile teams came from donor funds, 56% of the costs of campaign came from donor funds, and 43% of the costs of routine strategies came from donor funds (Logan Brenzel, The Costs of EPI, Arlington: REACH/JSI, 1990).

## V. ROLES IN A PARTNERSHIP FOR SUSTAINABLE EPI

Within a framework of role definition, some basic elements should receive increased emphasis by donors, technical agencies, and developing country governments. Efficiency must be improved to lower the average unit costs of fully immunizing children. Strengthening the health delivery infrastructure and integrating EPI into it may help to lower the costs per fully immunized child.<sup>7</sup> The knowledge base and the ability to find greater efficiency and productivity must continue to improve through better vaccines (e.g., vaccines which are more stable, which requires fewer doses, or which can be administered in new combinations), more reliable modeling of tradeoffs, and so forth. The reliability of public financing of EPI should also be pursued, as well as private financing (through employment based or other insurance, private donors, etc.).

All of these technical considerations must receive their due attention. However, these operational considerations, taken together, do not form a strategy for long term financial viability. As alluded to above, the ability of countries to move toward independent financial sustainability of EPI varies depending on economic circumstances and political will. It also depends on achieving technical requisites for sustainability, of which there are many. At the beginning of this paper, it was stated that donors, technical agencies, and developing country governments all have roles to play in working towards sustainability. Following are some basic elements of what these roles might be.

Allocation of Support on the Basis of Financial Need and Investment Value. This requires coordination and agreement on the part of all partners in EPI (donors, bilateral and multi-lateral technical agencies, and developing country governments). At present, countries of widely varying levels of economic development and wealth are receiving donor assistance in their EPI efforts. Need and investment value are both included here because it is unreasonable to consider either criteria in the absence of the other. Though it is beyond the scope of this paper to define exactly what the means of classification should be, a framework for allocation based on need and investment value would include the following divisions:<sup>8</sup>

Lowest priority countries are those that can and should be expected to pay the full hard-currency cost of their own EPIs. These countries should receive technical support if they request it, but should not receive financial support.

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<sup>7</sup> There is, however, little hard evidence of whether integrated programs (in which human and material inputs are diluted by many objectives) would actually result in lower cost per FIC over time.

<sup>8</sup> A complete classification would necessarily involve many factors, including absolute costs, affordability, expected time horizon for sustainability, present coverage rates, level of urbanization, factors affecting contagiousness, and so forth.

Medium priority countries are countries which cannot be expected to pay for adequate levels of their own immunization activities in the immediate and foreseeable future (throughout at least the next two decades). The designation as medium priority countries means that they should be able to rely upon the financial and technical support of donor countries well into the next century, for the most essential components of EPI.

Top priority countries are those which can be expected to carry out their national EPI in the near future if they receive financial and technical assistance specifically intended to foster financial sustainability. They may currently provide a significant share of their own EPI efforts, though throughout the immediate future, they will need some financial and technical assistance. A strategy helping these countries make EPI sustainable should provide not only financial and technical support in EPI but also help in developing financing strategies. Such a strategy will accelerate the time when they can carry on EPI without drawing heavily upon the limited resources of international donors, and in the long run allow the international community to focus resources on fewer countries.

Designating these priorities does not mean that the top priority countries should necessarily receive the largest per capita level of support, but rather that the key element in the strategy is to provide enough support, directed over a specific period of time, to make EPI in these countries fully sustainable. Top priority countries must be encouraged to support their own efforts financially in order to ensure that adequate resources are available for EPI. These countries should be able to continue to count on support by donors as they attempt to move closer to bearing the full cost of their EPI activities, depending on certain agreed upon criteria of progress. Of course, how much and how fast any country is able to do so will of course depend on a number of factors. With this kind of strategy in place in the coming decades, the total level of resources devoted to EPI can be expected to increase, as donor investment is concentrated in those areas in which the long term return is greatest.

Definition of Roles. In addition to the responsibility of recognizing resource limitations and developing a system for allocation based on need and value of investment (with some performance criteria), the partners in EPI have specific roles and responsibilities within the framework of sustainability.

Developing country governments can agree to the terms of reference of the partnership. They can work towards sustainability as a full partner, and place a priority on sustainable EPI strategies. Clear signs of commitment to the sustainability of EPI, through allocation of public resources, are a critical part of this process. They can also work toward improved reporting and monitoring, which enable donor agencies to assess progress toward EPI goals. Good management practices and clear accountability are essential in a partnership arrangement. Serious commitment to the development of accounting and reporting systems and other monitoring systems demonstrates the practical will to improve cost effectiveness and sustainability. Furthermore, responsible and well-managed national EPIs makes those programs not only more effective, but far more attractive as recipients of donor funds.

Donor agency policies wield tremendous influence, and these policies can be coordinated and adjusted to foster efficient and affordable approaches. For example, unit (per-child) costs may be lowered significantly if EPI activities are provided through integrated programs, or if coordination of field activities is improved. Rationalizing infrastructure development based on a criterion of whole life costs, as per the guidelines of WHO, is one direct way of improving efficiency. Other ways of supporting EPI while providing incentives for improving efficiency can also be developed.<sup>9</sup> Furthermore, donor countries can plan their long term support within the framework of a strategy which will make EPI sustainable, taking leadership in placing emphasis on sustainability first, and encouraging expansion and enhancements in ways which do not inhibit sustainability. As long as progress is being made, and reporting and monitoring of this progress is satisfactory, developing countries should be given considerable latitude in implementation; it is their responsibility to make EPI sustainable at the national level.

It is imperative that bilateral and multi-lateral technical agencies make a practice of explicitly addressing cost and sustainability considerations in the course of formulating technical approaches and recommendations. Eradication strategies, though initially costly, have the potential of permanently eliminating the costs of those diseases, as is demonstrated by the successful eradication of smallpox. But in control strategies for other diseases, it must be recognized that technical agencies have a decisive influence in determining whether the priority of EPI is to move toward more ambitious targets (which require strategies which are increasingly complex and costly and in which financial dependence is all but certain) or toward consolidation and financial sustainability. They must provide clear guidance on which components of a set of possible activities, and what levels of coverage, are essential, and which are desirable. This must be done with a view towards ensuring the long-term viability of EPI and addressing the tendencies and dynamics discussed above, while maintaining quality and efficiencies. Sustainability must be given a chance to take hold.

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<sup>9</sup> For example, if donor support for a country (i.e., through central MOH revenues) were made contingent upon maintaining an acceptable level of coverage (or acceptable progress toward that level), the country would have a host of incentives to increase coverage efficiently. But this must be done carefully, for time-limited targets discourage sustainability, rather than support it. Other possibilities to be explored include soft-currency conversion, endowments, and debt-equity swapping. Creative approaches along these lines can certainly be developed, with donor-funded technical assistance used to improve efficiencies and enhance sustainability. An example of a soft currency conversion approach is the Global Vaccine Independence Initiative developed by WHO/Geneva; examples of other strategies alluded to here are described in Gerald Rosenthal, "Financial Strategies for Meeting the MCH Goals for the Latin America and Caribbean Region for the Year 2000" (paper presented at the Regional Conference on Maternal and Child Health Strategies sponsored by UNICEF/PAHO/IDB, Quito, Ecuador, September, 1990).

## VI. CONCLUSIONS AND RECOMMENDATIONS

In the introduction to this paper it was asked whether EPI should be pursued at any cost. Pursuing EPI in a way which enhances its investment value, through a strategy of sustainability, does not mean that donors should shy away from EPI just because of its high costs. Indeed EPI is a high-priority, highly cost-effective intervention. But overlying this premise is the need to develop rational, long-term strategies that maximize EPI's benefits by including financial criteria within global strategies. It is hoped that by identifying the properties of sustainability and some of the tradeoffs that are involved, sustainability may begin to be placed in its proper perspective. Independent financial sustainability within a national EPI is not an absolute objective in the short term, but criteria for financial sustainability must be included in the strategic planning and development of EPI. Consolidating and ensuring EPI's hard-won gains should be essential parts of the global strategy, and further efforts to expand and increase objectives should be made upon this kind of sustainable base.

Essential to progressing toward EPI's financial sustainability are an improved allocation of resources and an improved defining of roles among the partners in EPI. Such actions, properly coordinated, can enable all three partners in EPI (donor agencies, technical agencies, and developing country governments) to rationalize the financial dimension of EPI and to continue to progress toward long-term sustainability.

**Recommendation 1: Determine resource allocation for EPI on the basis of both need and probability of sustainability of investment.**

This requires that donors, technical agencies and developing countries collaborate in the development of criteria for including specific countries within any priority category. If this resource allocation strategy is followed, the total number of countries requiring financial support can be expected to eventually decrease, while the total level of resources devoted to EPI will increase through the greater share that developing countries contribute to the cost of EPI.

**Recommendation 2: Keep EPI affordable at the global and national levels by developing and pursuing technical strategies that conform to the criteria of sustainability.**

This requires constantly striving to improve cost-effectiveness. Moreover, and perhaps more importantly, this means that EPI must not be "overloaded". Targets set, and strategies pursued, should not continually make EPI further away from the technical and financial reach of developing countries. A phased approach with high targets being set over time will do more for the public health over the long run than strategies which cannot be sustained. Similarly, the addition of new program activities should depend on explicit consideration of costs and cost-effectiveness within the country setting. Inputs from donor and technical agencies must be applied in such a way that technical strategies of EPI do not outstrip the ability of developing countries to thoroughly absorb the technical, human-resource, and financial capacity

to sustain EPI. EPI can be expected to continue to expand and improve in a linear fashion, but great short term increases in coverage under a strategy which is not sustainable by developing countries will not further the long-term objectives of EPI.

**Recommendation 3: Improve coordination of roles among the main actors in EPI.**

This includes coordination within countries, and coordination of international strategies. Moreover, this means that donors, technical agencies, and developing country governments can all contribute to the eventual financial sustainability of EPI. For example, developing country governments can develop policies and strategies which subordinate the objectives of certain international agencies to the goal of national sustainability. This can be supported by clear governmental determination to continue sustainable programs, by the long-term commitment of public funds and through activities which mobilize additional resources for EPI through other financing mechanisms. They can then play their role in the EPI partnership not only as implementers but as full partners, insisting upon strategies that contribute to sustainable EPI within their own national objectives. Donor agencies should direct their resources based on the allocation criteria set forth above, and coordinate activities and planning to enhance sustainable EPI. Expansion of EPI should be pursued after a sustainable foundation has been consolidated. Technical agencies should support the development of sustainable EPI by making sure that EPI is not overloaded by strategies or interventions that are impossible to sustain.

These recommendations are intended to provide only a rough framework within which to work toward ensuring the financial sustainability of EPI. As discussed in the preceding text, many more specifics need to be developed in order to provide clear procedural guidance for the elaboration of strategies and for implementation at the country level. But the objectives of keeping EPI affordable, and of using the investment in EPI to foster financial sustainability, will enhance the long-term impact of EPI.

VII. APPENDIX

TABLE 1: SUMMARY OF STUDIES OF THE COST-EFFECTIVENESS OF EPI

TABLE 2: EPI FUNDING LEVELS BY DONOR AGENCY

TABLE 3: EPI FUNDING LEVELS BY BILATERAL AND MULTI-LATERAL SOURCES

# Table 1

## COMPARISON OF COST-EFFECTIVENESS STUDIES OF THE EPI BY STRATEGY

COUNTRY	STRATEGY	COST 1987 \$	NO. FIC	COST/FIC 1987 \$
Burkina Faso (1987) <sup>1</sup>	Facility	\$26,707	5,977	\$4.47
Tanzania (1988) <sup>2</sup>	Facility	\$4,571,000	7000,000	\$6.53
Mauritania (1985) <sup>3</sup>	Facility	\$88,698	12,297	\$7.21
Philippines (1988) <sup>4</sup>	Facility	\$17,036,583	1,233,147	\$13.82
The Gambia (1982) <sup>5</sup>	Facility	\$442,222	26,791	\$16.51
Turkey (1988) <sup>6</sup>	Facility	\$15,265,676	803,568	\$19.00
Mean (n=6)		\$6,241,373	463,630	\$11.26
Mauritania (1985) <sup>3</sup>	Campaign	\$207,652	25,507	\$8.14
Cameroon (1987) <sup>7</sup>	Campaign	\$4,905,427	255,000	\$19.24
Senegal (1987) <sup>8</sup>	Campaign	\$3,678,669	188,864	\$19.48
Mean (n=3)		\$2,920,311	156,457	\$15.62
Burkina Faso (1987) <sup>1</sup>	Mobile	\$16,512	2,325	\$7.10
Mauritania (1985) <sup>3</sup>	Mobile	\$290,313	20,604	\$14.09
Mean (n=2)		\$158,476	11,465	\$10.60

<sup>1</sup> de Champeaux, Antoine, "Evaluation du programme elargi de vaccination, province de la Sissile," OCCGE, 1987.

<sup>2</sup>Ministry of Health, Tanzania, Joint Review on EPI in Tanzania, DANIDA Review Team (September 1987).

<sup>3</sup>Brenzel, L. Cost Effectiveness of Alternative Immunization Strategies in the Islamic Republic of Mauritania, UNICEF, 1986.

<sup>4</sup>Turner, Pamela, excerpts from a USAID Project Proposal (PP) for USAID/Manila, 1988.

<sup>5</sup>Robertson, R.L., et al., "Cost-Effectiveness of Immunization in The Gambia, Journal of Tropical Medicine and Hygiene, 1985, pp. 88, 434-351.

<sup>6</sup>Brenzel, L., The Cost-Effectiveness of the National Immunization and CDD Program in Turkey, REACH Publication, March 1988.

<sup>7</sup>Brenzel, L., "Cost-Effectiveness of Immunization Strategies in the Republic of Cameroon," REACH publication, August 1987.

<sup>8</sup>Brenzel, L., et al., "Rapid Assessment of Senegal's Acceleration Phase," submitted to UNICEF, November 1987.

## Table 2

**DONOR COUNTRY FUNDING FOR EPI**  
(Amount in millions of U.S. dollars)

DONOR COUNTRY	1985	1986	1987	1988	1989	1990
<b>United States</b>	\$30.31	\$50.37	\$50.90	\$38.50	\$44.02	\$43.29
Bilateral	33%	55%	66%	57%	61%	65%
Multil. Inst.	21%	16%	8%	9%	8%	4%
Other	46%	29%	26%	35%	31%	30%
<b>Canada</b>	\$15.91	\$15.77	\$16.00	\$17.00	\$14.15	\$11.85
For the best 1985-1990 period, on average: 17% bilateral; 77% multilateral; 6% other						
<b>Sweden</b>	\$ 1.20	\$ 1.00	\$ 1.00	\$17.40	\$17.10	\$17.20
Bilateral	87%	100%	100%	6%	6%	7%
Multil. Inst.	13%	0%	0%	84%	84%	83%
<b>Finland</b>	\$ 0.28	\$ 0.37	\$ 0.57	\$ 0.60	\$ 0.60	\$ 0.75
Multil. Inst.	100%	100%	100%	100%	100%	100%
<b>Italy</b>	--	\$40.00	\$40.00	\$40.00	\$40.00	--
Multil. Inst.	--	100%	100%	100%	100%	--
<b>United Kingdom</b>	--	--	--	--	--	\$14.60
Multil. Inst	--	--	--	--	--	96%
Other	--	--	--	--	--	4%
<b>West Germany</b>	EPI activities are integrated into other primary health care operations.					
<b>Japan</b>	Information not available					
<b>Denmark</b>						
<b>The Netherlands</b>						
<b>France</b>						

**NOTES TO TABLE 2:**

1. Canada's immunization support from FY 84/85 to 89/90 was 130.4 million Canadian dollars. This total does not include an additional 23.8 million still to be disbursed.
2. These figures represent FINNIDA's contribution to WHO-Geneva for EPI. Survey not able to ascertain whether FINNIDA had other channels through which it contributed to EPI.
3. These figures are based on information received from UNICEF. Survey unable to obtain information directly from the Italian Ministry of Foreign Affairs.

# Table 3

## EPI FUNDING LEVELS BY IMPLEMENTING AGENCY (Amount in Millions of U.S. Dollars)

DONOR ORGANIZATION	1985	1986	1987	1988	1989	1990
<b>Bilateral Donors:</b>						
U.S.A.I.D.	\$29.47	\$44.73	\$49.17	\$33.09	\$34.29	\$38.20
CIDA	2.87	2.84	2.88	3.06	2.55	2.14
SIDA	1.04	1.00	1.00	1.00	1.00	1.20
JICA						
DANIDA						
The Netherlands						
FAC						
Others						
Information not available						
<b>Multilateral Inst:</b>						
CPHA	--	--	\$11.22	\$16.27	\$7.33	\$1.95
UNICEF	--	52.40	76.85	74.60	110.98	--
WHO - Geneva	6.62	8.23	8.23	9.01	9.01	--
PAHO	--	--	6.84	6.84	6.84	6.84
<b>PVOs:</b>						
Rotary	\$0.34	\$2.41	\$4.18	\$15.78	\$10.82	\$14.57
PVO 25% Match	0.79	0.91	1.27	0.79	1.09	0.36
<b>ESTIMATED EXTERNAL CONTRIBUTION</b>						
	\$41.13	\$112.52	\$161.64	\$160.44	\$183.91	--
<b>Developing Countries:</b>						
LAC	--	--	\$72.26	\$72.26	\$72.26	--
AFR						
ANE						
Information not available						

### NOTES TO TABLE 3:

1. Cida expended 22.2 million Canadian dollars through its bilateral channel from the period FY 84/85 to 89/90. Added to the amount was 946,261 dollars disbursed through the Special Projects Branch to NGOs and 360,263 dollars disbursed through the Business Cooperation Branch in support of immunization. This total, 23.51 Canadian dollars was divided by six years for an average expenditure of 3.92 Canadian dollars and then converted to U.S. dollars. CIDA's 50.69 million dollar contribution to CPHA and 50.3 million dollar contribution to UNICEF are not included in these figures.

2. These figures include only direct bilateral expenditures to Angola and Zimbabwe. SIDA also contributed \$47.87 million to UNICEF supplemental programs from 1988 - 1990 and \$0.48 million to WHO-Geneva from 1989-1990.
3. CPHA works in collaboration with approximately 25 "partners." The partner contribution was : FY86/87 = 55%; FY 87/88 = 19.5 percent; FY 88/89 = 12.5%; and FY 89/90 = 23.5 percent. The remainder of the total was given by CIDA.
4. Total commitments from PAHO from 1987 - 1991 equalled \$34.2 million. This total was divided by 5 years to arrive at the average commitment per year. Of the \$34.2 million, \$1.2 is from CPHA, 20.6 is from A.I.D., \$5.5 is from IDB, \$1.2 is from Rotary, and \$5.7 is from the regular budget.
5. A.I.D. requires that PVOs contribute a 25 percent "match" on total project cost for all projects done in collaboration with A.I.D. This match is generally from community organizations, host country governments, etc.
6. Total commitments by LAC Ministries of Health equalled \$361.3 million from 1987 - 1991. Total commitments were divided by 5 years to arrive at an average commitment per year.
7. We were unable to obtain this information for AFR and ANE. A rough estimate of the amount contributed by African MOHs is \$30 million per year, and an estimate of the amount contributed by Asian MOHs is \$139 million per year. These estimates assume that on average MOHs contribute 45% of total dollars spent on immunization (from: Brenzel, L. "The Cost of EPI: A Review of Cost and Cost-Effectiveness Studies," 1989). If the external contribution is \$200 million per year (an optimistic view of the estimated external contribution calculated in the table), the total amount spent on immunization per year is approximately \$364 million. Africa accounts for 22% (\$80 mill.) of this total and Asia accounts for 66 (\$240 mill) of this total (estimated in: REACH, "Sustainability of EPI," 1990). On average, African MOHs contribute 38% of the total costs of immunization (Brenzel, 1989) and Southeast Asian countries contribute 58% of the total support provided for EPI (Henderson, R.H. "World Health Organization Expanded Programme on Immunization: Progress and Evaluation Report," 1989).