



A Guide for Monitoring and Evaluating Population-Health-Environment Programs

MEASURE Evaluation, USAID

A Guide for Monitoring and Evaluating Population-Health-Environment Programs

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Table of Contents

List of Acronyms	6
Preface	7
Summary List of Indicators	10
PART ONE – OVERVIEW OF THE GUIDE	13
Introduction	14
Conceptual Framework for Population-Health-Environment Programs	21
PART TWO – PROGRAM MONITORING AND EVALUATION	23
Using Indicators in Program M&E	24
Participatory Approaches to M&E	30
Methods and Data Sources Used in this Guide	39
PART THREE – INDICATORS	47
Population Indicators	48
Health Indicators	60
Environment Indicators	78
Integration Indicators	104
Value-Added Indicators	116
Glossary	151
Bibliography	155

The CD-ROM included with this guide contains MEASURE Evaluation's *M&E Fundamentals: A Self-Guided Minicourse*, which covers the basics of program monitoring and evaluation in the context of population, health, and nutrition programs. It also defines common terms and discusses why M&E is essential for program management. The M&E manual can also be downloaded from MEASURE Evaluation's Web site at: www.cpc.unc.edu/measure/publications/pdf/ms-07-20.pdf, and this manual is also available at: www.cpc.unc.edu/measure/publications/pdf/ms-07-25.pdf.

Photographs by Theresa Finn.

List of Acronyms

CBD	community-based distributor
CPR	contraceptive prevalence rate
CYP	couple-years of protection
DTP	diphtheria, tetanus, and pertussis
GBV	gender-based violence
GPS	global positioning system
ITN	insecticide-treated bed nets
LAM	lactational amenorrhea
NGO	nongovernmental organization
NRM	natural resource management
ORS	oral rehydration salts
ORT	oral rehydration therapy
PHE	population-health-environment
RHF	recommended home fluids
TBA	traditional birth attendant
Td	tetanus-diphtheria toxoid
TT	tetanus-toxoid
USAID	U.S. Agency for International Development
WHO	World Health Organization

Preface

For well over three decades, dozens of community-based development and conservation projects experimented with a seemingly unlikely innovation: combining efforts to help communities manage and conserve their natural resource base with efforts to improve their health and access to family planning information and services. These projects came about as conservation or community development projects focusing on natural resource management found that women came forward and asked for help to plan pregnancies and improve their communities' health. Conservation, community development, and health non-governmental organizations (NGOs) then took the initiative to create programs linking health and conservation. These programs evolved into the current generation of population, health, and environment projects, or PHE projects as they are now more commonly known.



At their most basic, PHE projects deliver family planning, basic healthcare, environmental management or conservation information, and services interventions to rural communities in a coordinated or integrated fashion. However, on the ground, PHE projects can look very different depending on the local interactions among population dynamics, human health problems, and the threats to local environmental conditions. What all PHE projects have in common is the understanding that human populations can be one of the major threats to the environment they inhabit, that human health is inextricably linked to the environment, and that it is more effective to work across the human health and environment sectors than to pursue their interventions in isolation. Conservation and natural resource management organizations also believe that they can build more rapport with local communities by facilitating the delivery of needed health services. Health organizations find they are better able to reach underserved communities in remote areas by partnering with environmental organizations that are already established in those communities. Many projects have also experienced the added benefits to integrating across the PHE sectors — including more women in natural resources management activities, engaging men on reproductive health and family planning decisions, and reaching underserved communities in remote, but often biologically diverse, areas.

The complex connections between people and their environments are evident worldwide. Numerous books, research papers, Web sites and white papers have outlined the many connections between humans and the land, water, air, and other natural resources that they depend upon for livelihood and well-being. Human populations, while slowing in pace, continue to grow; meaning that more and more people must share finite resources. In addition, as economies grow and their citizens' spending power multiplies, rising consumption patterns place unsustainable pressure on increasingly scarce resources. These human pressures precipitate environmental change and degradation, which can then lead to adverse human health impacts. For example, unsustainable fisheries practices lead to fisheries collapse and result in malnutrition in coastal communities accustomed to fish as their main protein source. These linkages clearly establish a rationale to work across the individual population, health and environment sectors. However, most projects struggle with operationally linking population, health and environment interventions and then measuring them to demonstrate the importance of those linkages.

This is why developing a publication like MEASURE Evaluation's Monitoring and Evaluation Guide to Population-Health-Environment Programs is so important. For several years, implementers and donors working in the PHE field have eagerly discussed the need for a tool that can help them measure the results and rewards of integrated PHE projects and demonstrate the benefits of the PHE approach to achieving larger development goals. In addition, no single implementing organization can be a technical expert in all three fields. Therefore, PHE field practitioners who are designing PHE monitoring and evaluation (M&E) systems need an easy-to-use guide to the most important and trusted indicators across the population, health, and environment fields. This guide will meet these needs within a realistic framework that was developed in consultation with current leading PHE practitioners. Their guidance helped select the most highly recommended indicators in each field, with emphasis on those that have been tested in past PHE projects.

A word of warning, however, for those who are hoping that the guide will be the solution to all their challenges when developing and implementing cross-sectoral PHE projects: cross-sectoral integration is an art, rather than a science. Project designers and managers will have to be creative in how they decide to conceptualize the linkages in their project sites between humans, their health, and their environment; and how they decide to program to these conceptual linkages. This guide is no substitute for rigorous program analysis, in the project design phase, to better understand the

PHE links on the ground and to develop a conceptual framework based on those linkages that will guide the program throughout its lifecycle. Once your conceptual framework is in place, however, this guide should provide concrete advice on how to measure the implementation and results of the project's conceptual framework through standardized indicators and a rigorous monitoring and evaluation system.

As was stated before, there is significant diversity in how PHE projects are implemented on the ground. It is truly important to maintain that diversity because above all, PHE represents an integrated response to the concrete linkages in unique population, health and environment conditions in each project site. However within this diversity, there is an urgent need for our field to develop standard measures so that we, as decision makers, researchers, and advocates, can aggregate data across all PHE projects and sites in order to demonstrate the value of PHE integration and make a better case for increased investment in this field. This guide represents the first step toward filling that need and achieving success in promoting PHE as a development strategy for the future.

Heather D'Agnes
Population-Environment Technical Advisor, USAID

Summary List of Indicators

Population Indicators	Page
1 Percent of program staff trained to work with or provide reproductive health services to adolescents	49
2 Percent of women of reproductive age (15-49) who were clients of a community-based distributor in the last year	50
3 Couple-years of protection	51
4 Average household distance/time to the nearest health center	53
5 Percent of skilled health personnel knowledgeable in obstetric warning signs	54
6 Number of acceptors new to modern contraception	55
7 Contraceptive prevalence rate	56
8 Percent of deliveries occurring in a health facility	57
9 Percent of births attended by skilled health personnel	58
10 Percent of women attended at least once during pregnancy for reasons related to pregnancy	59

Health Indicators	Page
1 Number of doses of tetanus vaccine distributed	61
2 Number of insecticide-treated bed nets distributed	62
3 Number of packets of oral rehydration salts distributed	63
4 Number of safe water storage vessels distributed	64
5 Percent of pregnant women receiving at least two doses of tetanus toxoid vaccine	65
6 Percent of children aged 12-23 months fully immunized before 12 months	67
7 Percent of households with access to an improved water source	69
8 Time spent by household members to collect water	71
9 Percent of households using an improved toilet facility	72
10 Percent of households using soap in last 24 hours	73
11 Percent of households storing drinking water safely	74
12 Percent of children under five years who slept under an insecticide-treated bed net the previous night	75
13 Oral rehydration therapy use rate	76

Environment Indicators	Page
1 Percent of communities in target area that have developed a community-based natural resource management plan	79
2 Number of officers trained in laws and enforcement procedures and posted to a permanent enforcement position	81
3 Hours of enforcement patrols logged	83
4 Area of legally protected habitat	85
5 Number of trees planted	87
6 Percent of trees planted that survive	88
7 Number of educational sessions on improved agricultural/marine practices	90
8 Percent of community-based natural resource management plans that are approved by a government authority	92
9 Percent of farmers/fishers who adopt improved agricultural/marine practices	93
10 Area of habitat under improved management	95
11 Population structure of species	97
12 Area of secondary forest regenerated	98
13 Species richness	100
14 Species abundance and distribution	102

Integration Indicators	Page
1 Number of linked messages/materials created	106
2 Instances of population, health, or environment organizations addressing non-traditional audiences	107
3 Number and frequency of PHE educational sessions provided in the target community	108
4 Number of new PHE partnerships created that make linkages among organizations or institutions from different sectors	109
5 Instances of organizations facilitating access to services outside of their traditional sectors	110
6 Number of policy-makers, media, and scholars knowledgeable about or aware of a specific PHE issue	111
7 Percent of households knowledgeable about or aware of a specific PHE issue	112
8 Percent of communities in target/project area receiving all three PHE elements	113
9 Number of enabling local ordinances/policies supporting PHE	114
10 Number of placements of linked PHE messages in print and electronic media by independent sources	115

Value-Added Indicators	Page
1 Percent of communities with functioning community-based natural resource management committees	120
2 Number of educational sessions provided on new or alternative income-generating activities	121
3 Net dollar value of socially-marketed products sold	123
4 Percent of men and women who know where to access modern family planning services	124
5 Number of children who show improvement on a growth chart	125
6 Yield per area per year or cropping or fishing cycle	126
7 Percent of youth participating on community-based natural resource management committees	128
8 Percent of leadership positions held by women on natural resource management committees	129
9 Number of validated infractions reported in deputy logs	131
10 Number of fuel-efficient stoves distributed	133
11 Percent of youth who used a condom at last high-risk sex in the previous year	135
12 Percent of adults who used a condom at last high-risk sex in the previous year	136
13 Percent of men who support the use of modern contraception for themselves or their partners	138
14 Percent of households with ventilation in cooking area	140
15 Percent of children under five years of age with low weight for age (underweight)	141
16 Average household consumption of firewood in target area	144
17 Household income	146
18 Percent of households that earn income from new or alternative income-generating activities	148



Part One | Overview of the Guide

Introduction

Organization of the Guide

This guide is organized into three parts. **The first part** provides an overview of the guide, including its organization, development and purpose. **The second part** consists of technical information, including a brief process by which integrated PHE program managers can develop an M&E plan, types of evaluations, a list of generic monitoring and evaluation terminology, and the major data sources from which the indicators in this guide



are drawn. This section also includes guidance on the importance of assessing data quality. The section on data sources should serve as a reference point for implementation of the indicators. **The third part** contains the indicators themselves, which are divided by technical area: population, health, environment, and indicators of integration, and value-added. Each indicator description contains the definition, disaggregates (if appropriate), a time frame, data sources and collection considerations, as well as strengths and weaknesses. Programs should define and measure indicators in the same way. This allows for comparison across countries and programs. The use of comparable measures can also provide international programs with valuable measures of the same indicator in different populations and habitats, enabling triangulation of findings and regional or local differences to be addressed.

This guide can serve as a reference document for the entire international PHE community. Although funded by USAID, *A Guide for Monitoring and Evaluating Population-Health-Environment Programs* applies to PHE programs sponsored by other funding agencies, governments, or NGOs. Specifically, the guide provides a menu of indicators to be used selectively as part of the M&E of regional programs and country projects, reflecting the locally based nature of PHE programs. The indicator descriptions presented herein are designed to promote standardization of definitions and concepts among the international PHE community. However, even though standardization is useful, organizations should adapt indicators to their specific circumstances. This approach ensures that indicators are relevant to specific organizations and promotes ownership of the M&E pro-

cess. That said, organizations that choose to adapt indicators should clearly state the modified definitions and methods in their M&E plans.

No program or project should ever use all of the indicators outlined in this publication. The choice of indicators should be driven by the objectives, goals, activities, and scale of the program and its projects. Additionally, programs should consider the time and money it costs to collect and analyze data for each indicator. For routine monitoring purposes, program managers should select a handful of indicators that are economical to collect and relevant to program objectives. Some of these indicators may need to be adapted for specific program needs. For organizations that need more information, one option is to conduct special studies to evaluate program performance in specific areas of interest. In this case, managers should stagger these studies to minimize the research burden. It is the responsibility of program managers and implementers, in consultation with donors, to decide which indicators each PHE program should collect, based primarily on what the program is expected to achieve.

Some program and project managers may be overwhelmed by the volume of indicators in this guide and by the process of selection. Some may want to know, for example, the key 10 to 15 indicators that are essential for monitoring and evaluating PHE programs worldwide. Having such a “short list” may be useful for international donors and governments, but program managers may find such a list impractical for monitoring and evaluating their specific interventions. Mainly, such global indicators usually require population and habitat-based surveys, which may be beyond the scope of most PHE programs working in focused regions or with specific populations. Most program managers will also want M&E to cover program results as well as progress made in specific functional areas, such as training or behavior change. It is important to keep in mind that the specific indicators useful in a given M&E framework will depend directly on the purpose of the program.

Purpose of the Guide

An information system is the backbone of M&E and is founded on a cycle of information sharing and feedback. M&E systems address the challenge of measuring program success in cost-effective, practical ways. Effectively measuring programs through M&E provides the evidence-base upon which to compare programs, share best practices, secure donor and community support, and ultimately meet program goals and objectives. Without a fully functioning M&E system, programs lack the objectively verifiable evidence to support the credibility of their work. M&E systems

generate information that can be used in empirical analysis and articulation of compelling arguments to advocate for policy reports and development.

The need to develop and implement M&E plans based on uniform measures that create an evidence base for worldwide population-health-environment projects and programs has long been recognized (Kleinau & Talbot, 2003; Pielemeier, 2005; Margoluis & Salafsky, 1998; Oldham, 2006). Experts suggest M&E should be part of program design and the definition and selection of indicators should guide program implementation and progress. PHE programs also may have difficulty deciding whether to use single-sector indicators or indicators that measure the effects of multi-sector collaboration. Donors may expect the former choice to show results better, while the latter choice can better reflect coordination and integration between programs. M&E researchers have emphasized that cross-sectoral collaboration on monitoring and evaluation is necessary to establish integrated-intervention impact (Kleinau & Talbot, 2003).

A review of PHE programs in Madagascar and the Philippines noted the lack of outcome data across PHE programs. Echoing previous observations, the author stressed that donors have an expectation of reporting sector-specific indicators, but strong M&E systems that gather key program-wide information may generate more convincing evidence for the need to retain PHE programs (Pielemeier, 2003).

Another recent report noted the dearth of PHE data and information at the outcome and impact levels. This report proposed specific evaluation questions to answer questions about how local communities participate in PHE programs, the quality of health services PHE programs provide, and the livelihood activities implemented by some PHE projects (Oldham, 2006). In order to carry out these evaluations, programs must collect data on indicators that speak to these concerns. Part of the solution may lie in M&E systems based on uniform measures and high-quality data.

This guide is by no means a comprehensive list of all the possible indicators that could be applied to PHE programs. The process of developing international consensus on frameworks, indicators, and tools typically involves consultations among global partners and takes considerable time and effort. This guide represents the results of such consultations. While most of the indicators in this guide have been tested and used extensively in the field, there are proposed standard measures of integration that will be new to the field. In fact, these indicators represent an effort by the PHE community to initiate standard measurement across programs.

Given the diverse specialties involved in PHE work, few can claim to have expertise that spans the full range of PHE activities. While different PHE programs share the vision of integrating the health of humans and the environment, the actual measures of progress toward that goal differ from one type of program to the next. This guide has been written in light of the previous efforts and suggestions from PHE experts regarding the need for a variety of standardized indicators with which PHE programs can use common measures while retaining their diverse programming.

Objectives of the Guide

The overall objective of this guide is to encourage program monitoring and evaluation and improve the quality of work in the population-health-environment area. To this end, the guide provides a comprehensive listing of the most widely used M&E indicators for population-health-environment programs in developing countries. The indicators are organized using a generic conceptual framework that maps the pathways through which programs achieve results, constituting a logical framework for developing an M&E plan with the most appropriate indicators.

This guide focuses on indicators of all stages of program achievement and across multiple sub-specialties within each technical area. This guide also presents a list of standard indicators to unify a national PHE project and discusses data collection and sources, data quality, and information-use protocols. This guide does not, however, present all the possible indicators that may be applicable to every PHE program. Local, program-specific indicators should be developed with careful consideration to resources and utility.

The specific objectives of this guide are to:

- compile in a single publication a menu of population-health-environment indicators judged most useful in monitoring and evaluating PHE programs at both the program and the population/habitat levels;
- define these indicators in an effort to encourage the use of standardized definitions of indicators and terminology across PHE programs, countries, and donor agencies; and
- promote the M&E of PHE programs by making indicators available and easier to use.

This document does not elaborate in detail about the various evaluation approaches that have been or could be developed in the PHE M&E field.

Program decision-makers should explore evaluation and develop methodologies tailored to program needs, and if necessary, seek the assistance of evaluation experts.

This document also is not meant to be used as a guide to developing a PHE program. As such, this guide does not discuss the varied conceptual approaches to PHE. This debate is best left to PHE practitioners. This document is focused on presenting common indicators for PHE programs that are useful, reliable, measurable, cost-effective, and comparable across programs.

Several different PHE groups should find this guide useful in their work. The intended audience of the PHE indicator guide includes:

- staff working for international PHE programs in resource-poor settings;
- monitoring and evaluation specialists working in PHE;
- public and private donors supporting PHE programs;
- potential PHE practitioners interested in learning more about M&E of PHE programs; and
- directors and managers of PHE programs worldwide.

How these Indicators Were Selected

In 2006, PHE practitioners from six organizations were consulted in the development of this guide and in the selection of indicators. These organizations represent the local, national, and global commitment to PHE integration and effectiveness. In addition to these individual consultations, a technical advisory group comprised of PHE practitioners and managers met to set parameters and criteria for a set of standard indicators for the PHE field of practice. To the extent possible, this guide uses indicators that have already been field-tested. However, some indicators from emerging measurement areas, such as integration and community-based activities have only been recently developed. These indicators represent recommendations of experts working in these areas to stimulate dialogue on evaluation and to provide possible indicators for testing as new types of PHE programs become more common.

The following standard logic model for program development served as the basis for selecting indicators. This guide includes indicators that measure achievements for each element in the model.



To be effective, indicators must meet a variety of requirements. The indicators in this document were chosen to be:

- **valid** – accurately measuring a behavior, practice or task;
- **reliable** – consistently measurable in the same way by different observers;
- **precise** – operationally defined in clear terms;
- **measurable** – quantifiable using available tools and methods;
- **timely** – providing measurement at time intervals that are relevant and appropriate for program goals and activities; and
- **programmatically important** – linked to a public health impact or to achieving the objectives that are needed for impact.

The specific criteria used for selecting these PHE indicators took into account three factors: the indicator relevance to PHE programs; the feasibility that PHE programs can collect the data; and the added value that collecting the indicator would give to the PHE program.

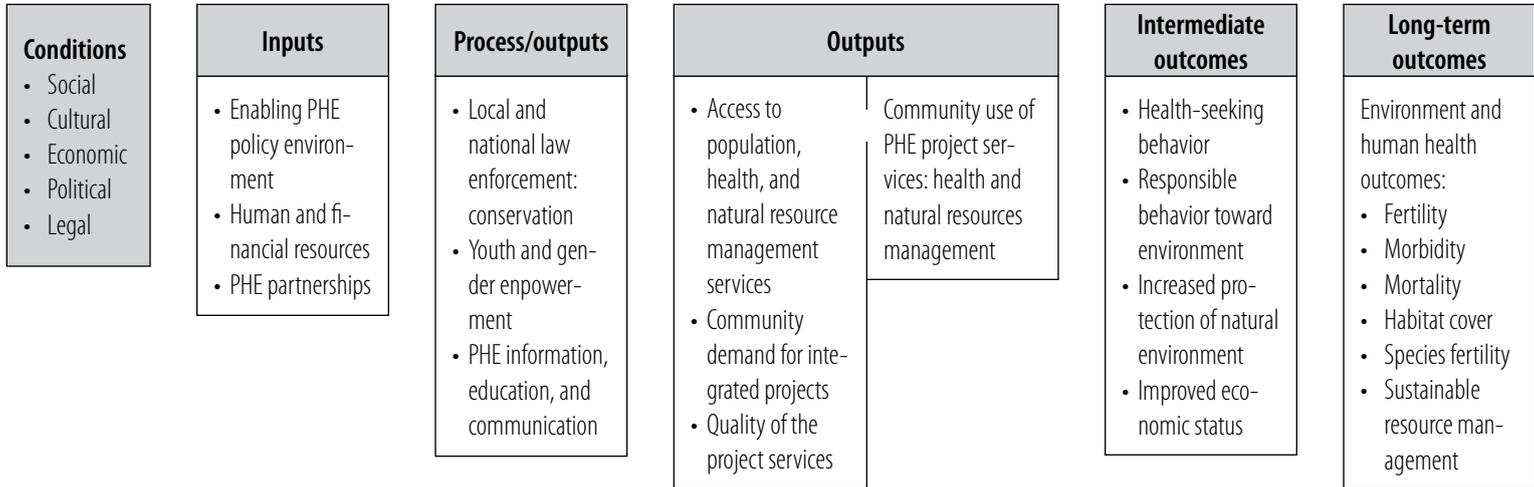
Relevance to PHE projects and programs can be more specifically defined as the indicator's usefulness in responding to donor requirements and in demonstrating project results, both for improved program management and for increasing the evidence base for advocacy purposes. Although the indicators in this guide are divided by technical sector, PHE programs aim to integrate the three sectors in the implementation. Therefore, there are some sector-specific indicators that reflect the linked nature of the programs better than others and the use of indicators in past and current PHE programs.

Most PHE programs work in resource-poor settings with a minimum of staff and infrastructure. The feasibility of data collection refers to the consideration of the inputs required from the PHE program to obtain the data for the indicator. Feasibility considerations for this guide are cost, timing or frequency of data collection, and whether or not special skills or expertise are required for indicator collection. This guide contains indicators that require varying degrees of knowledge and resources to allow program managers to choose the most appropriate and feasible indicators for their own programs.

Value added is an important concept for PHE programs, as multi-sectoral cooperation and implementation allows for combined efforts across sectors. The definition used here for value-added is the identification of indicators that contribute to results across two or more sectors in such a way that outcomes go beyond those anticipated if the interventions had been

implemented separately. Indicators that provide information about one or more groups of people who may not have been targeted in the intervention but are still reached through the intervention are considered value-added as well. Indicators that reach non-traditional and diverse audiences may provide outcomes in several sectors. Value-added indicators are different from integrated indicators, which measure the project's success in implementing cross-sectoral approaches. Value-added rests in the multidisciplinary nature of PHE approaches in addition to the cross-sectoral arrangements through which they operate. If the sectors working together in the PHE strategy are complimentary, their effects may reinforce each other to yield surplus or extra outcomes. Measurements of indicators that could produce value-added information are listed separately in this guide and are divided by sectors relevant to the outcomes.

Conceptual Framework for Population-Health-Environment Programs





Part Two | Program Monitoring and Evaluation

Using Indicators in Program M&E

Program Monitoring

Monitoring is the routine tracking of program activities by regularly measuring whether planned activities are being carried out. Monitoring informs program and project managers whether activities are being implemented according to plan, at what cost, how well the program is functioning at different levels, the extent to which a program's services are being used, whether interim targets are being met, and whether key performance measures are being achieved. Because program monitoring data are sometimes used in evaluation activities, both monitoring and evaluation are necessary to measure PHE programs effectively.

Program Evaluation

Drawing from a program's list of indicators, mixed data sources and quality data, evaluators can derive information to report program achievements. This information can be used not only for donor reporting, but more importantly, to revise program practices to better achieve desired outcomes.

Contents of a Typical Evaluation Plan

1. **Brief project description**
2. **Objectives of the project**
3. **Objectives of the evaluation**
4. **Evaluation methodology** – type of evaluation, indicators to measure each objective, data collection methods (surveys, interviews, focus groups, service statistics, etc.), sample size, methods of sampling (or selecting participants)
5. **Resources needed, timetable, and budget** – material, human, financial, transportation and logistics
6. **Anticipated use of results** – for example, improve the project mid-course, plan future projects, guide decision-making

Evaluations require planning, funding, and time. They are possible only if an M&E system is functioning and delivering quality data on key indicators. Programs/projects should focus on developing and implementing M&E plans and systems in preparation for conducting evaluations.

Evaluation is designed to determine the value of a specific program, intervention, or project. It can evaluate a program's process, outcome, or its impact to help answer three basic questions, which are explored further here.

1. How well has the project been implemented?

Process evaluation demonstrates progress in implementing the program as planned. Process evaluation focuses on the implementation of project activities and not on the desired results or outcomes. It often focuses on process- and output-level analysis and precedes evaluations of short-term outcomes.

Process evaluation is the measure of products and services provided by a program and the quality of those services and products. Process evaluation should describe the number and quality of activities implemented as well as any obstacles encountered. If program managers implement a process evaluation in a timely manner, they can use the results to make mid-course corrections. Process evaluation is generally easier than measuring results, especially when it involves counting numbers of clients or completed activities. This type of evaluation also helps to assess the extent to which program level objectives are being achieved through comparing actual achievements with targets.

2. Has the desired change been achieved?

Outcome evaluation examines behavioral changes in addition to increases in knowledge, attitudes, and/or beliefs in a population. Successful projects have clear, realistic, and measurable objectives. Monitoring these objectives measures the extent to which the desired changes are achieved and the objectives are met. Generally, the change in question relates to knowledge, attitudes, or practices of the target population. Monitoring of results allows us to determine if the desired change has occurred among the intended audience. Another type of change measured in this category may deal with the manner in which the services/activities are provided to the target population, such as access to the services or quality of service provision.

To measure change, the evaluator must have data from before and after the intervention. Alternatively, the evaluator can establish the expected level to be achieved by setting targets and then determine whether the project achieves this in a defined period of time (e.g., three hectares of forest regenerated or 60% of children fully immunized).

However, as in the previous examples, the pre-intervention levels may not be known. As a result, some programs may want to conduct baseline assessments, such as small-scale population-based cluster surveys, or refer to pre-intervention satellite images. The findings from these assessments can be used to set targets for key project outcomes and to build consensus among key stakeholders in terms of local needs and priorities.

3. If the change has been achieved, to what extent can it be attributed to the project?

Impact evaluation (demonstrates cause and effect) is the use of specific study designs and special studies to measure the extent to which changes in desired PHE outcomes are attributable to a program's interventions. Impact evaluations measure the health, economic status and quality of life of the target population and the health, condition and growth of the environment. Impact evaluation is sometimes called impact assessment, program research, or operational research.

Experimental study designs allow cause-and-effect to be evaluated with relative precision. The most widely known of these designs is the pre-test/post-test control group design with randomization. With this design, change attributable to the intervention can be measured, decreasing the possibility that unrelated factors influenced the results.

In addition to experimental designs, other methodologies can measure program effects. Appropriate statistical techniques allow evaluators to measure the extent of change. Moreover, evaluators can identify the relative importance of different factors (i.e., exposure to the program intervention) to explain the observed change. However, this approach may not be practical for small programs because of the large samples and complex statistical analysis required. If a program desires to implement an impact evaluation, an expert should be consulted.

Quantitative Versus Qualitative Data

Mixing qualitative and quantitative data sources can strengthen your claim for achieving program objectives and goals. Indicators required by donor agencies often request quantitative information (e.g., number, percents, rates or ratios); however, PHE programs benefit by supporting these numbers with qualitative evidence to tell the complete story of program integration.

Due to the specific questions that arise in implementing integrated programs, special care should be taken to select methodologies that provide information about processes and outcomes coming from qualitative as well as quantitative methods.

Table 1 – Differences between Quantitative and Qualitative Methods

Quantitative	Qualitative
Describes how many and how much	Describes how and why
Uses predominately closed-ended questions	Uses predominately observations and open-ended questions
Provides numerical data and statistics	Provides data on perceptions and beliefs as well as descriptions of conditions and care
Requires large samples, preferably selected at random	Permits more limited samples, generally not selected at random
Yields more superficial responses to sensitive topics	Offers more in-depth responses on sensitive topics
Results can be generalized to the target population or ecosystem	Results apply only to the segment of the population or specific sub-area of the ecosystem that is studied

Program-Based Versus Population-Based and Habitat-Based Measures

It is important to distinguish between program-based and population-based or habitat-based measures. Program-based data consist of information available from program sources (e.g. facility-based/community-based service statistics, project records of trainings and educational sessions, administrative records) or information that can be obtained from on-site collection (observation, client-provider interaction, interviews with farmers, natural resources management committee functions). Where such systems are functional, routine information systems are the primary source of this type of information. Program-based information is very important for understanding program performance and the type of output programs achieve. When data on the entire regional populations are available as a denominator, estimated program-based information can reflect service coverage.

In contrast, measures that aim to evaluate effects on the general population are referred to as population-based. This term can also refer to a smaller geographic region (e.g., the target area for the specific project), provided that the data are drawn from a representative sample. Similarly, habitat-based refers to evaluation of the larger target area of the environment. Rather than program-based measures (e.g., trees planted, improved practices sessions provided, or enforcement officers trained), habitat-based measures represent outcomes on the entire habitat (e.g., forest regenerated, area under improved management, species abundance).

Program-based indicators usually measure inputs, processes and outputs, while population- and habitat-based indicators usually measure outcomes and some outputs. These terms are used throughout this guide. Inputs refer to human, financial, and material resources a program uses, while processes refer to the activities programs carry out to achieve the objectives. It is important to measure these two levels separately, because it is possible to have a high level of input for a poorly delivered program. For instance, a PHE program could provide inputs for new income-generation activities in the community but fail to give the educational sessions the community needs to learn how to do the new activity. In this case, the inputs may have been available on-time and be of high quality, but an activity that was necessary to achieve the objectives of the project was not completed.

Outputs refer to the results of the efforts at the program level. In PHE, outputs refer to trainings held, behavior change communication activities, delivery of selected health services, as well as completion of community-based natural resource management plans. While outputs are related to services that projects provide to the community, outcomes refer to changes measured at the population and habitat levels. Examples of outcomes include changes in the target population's knowledge and behaviors, or increased tree and wildlife species in the target habitat. Long-term outcomes also refer to coverage and disease prevalence.

Impacts, a process associated with evaluation rather than monitoring, refer to the beneficial health and environmental outcomes in the population a program or project makes. Impacts are not a major focus of this guide.

Data Quality

Collecting high-quality data from multiple levels is an essential component of an effective M&E system. Data should be collected in accordance with clear standards to ensure accuracy and validity. These standards should be discussed in the process of writing the M&E plan and compared across sectors. Key issues in data quality include the following:

- **Double-counting** – Counting services, species, or other units twice (or more than twice) for an indicator can inflate data and compromise information. Double-counting can occur either within an organization or between partners. Double-counting within an organization occurs when one organization provides the same service (training, treatment, care, etc.) multiple times to the same individual within one reporting period but records multiple persons as having received these services. Double-counting between organizations occurs when

two or more organizations supply the same service to the same individual, either at the same site or at different sites, within one reporting period, and both partners add the individual to their count of the service delivery. Avoiding double-counting is one component of supplying valid data.

- **Coverage** – Collected data should be representative of the area program interventions cover. Incomplete data forms or low facility reporting coverage may affect reporting accuracy. Providing good coverage is one component of supplying valid data.
- **Timeliness** – Data are recent and available on time. Data collected and reported at inconsistent time intervals can give an inaccurate picture of program performance across time. Incomplete data may mask seasonal effects on PHE programs or other temporal factors.
- **Reliability** – The data are measured and collected consistently over time and at the same times for the predetermined intervals.
- **Integrity** – The data are protected from deliberate bias or manipulation at all levels.

A participatory approach to M&E can minimize data-quality problems. Talking with partners across the sectors that are involved in PHE programs can inform the M&E working group on what data are collected, how they are collected, what are the best sources of data for the purposes at hand, and what gaps in data and knowledge remain to be filled.

Data-Quality Audits

An outside evaluator should audit data on a periodic basis. The following steps can serve as a guideline for auditing data elements.

1. **Observation** – Observe or describe the connection between the delivery of services or commodities and the completion of the source document that records that service delivery.
2. **Documentation Review** – Review availability and completeness of all indicator source documents for the selected reporting period.
3. **Trace and Verification** – Trace and verify reported numbers:
 - recount the reported numbers from available source documents;
 - compare the verified numbers to the site-reported numbers; and
 - identify reasons for any differences.
4. **Cross-checks** – Perform cross-checks of the verified report totals with other data-sources (e.g. inventory records, laboratory reports, etc.).
5. **Spot-checks** – Perform spot-checks to verify that services or commodities are actually delivered to the target populations.

Participatory Approaches to M&E

Just as a chain is only as strong as its weakest link, an M&E system is only as strong as the individuals who collect, analyze, and interpret the data, and the people who use the information and help identify gaps in the data. By nature, a fully functional M&E system is only achieved through a participatory approach to system development and implementation. It requires consensus, capacity building, and human and financial investments. These aspects are especially important to integrated projects, where implementers have diverse backgrounds and experience in monitoring and evaluation methods. The participatory approach and consensus-building activities include gathering stakeholders for group discussions on measurement goals, setting data quality standards, and making information transparent and available to all stakeholders. The Conservation Measures Partnership has identified the involvement of stakeholders as a general principle in the project-management cycle.

One of the first requirements is to define internal and external stakeholders. Internal stakeholders include your project team (which can be as few as two people) composed of NGO staff, local stakeholders, researchers, or whomever else you find important to include. External stakeholders include community members, and other individuals and institutions that have some interest in and connection to the project. In conducting your project, it is important at every step to make sure you involve the appropriate internal and external stakeholders in the proper manner. (Conservation Measures Partnership, 2004)

To develop a functional, successful, PHE-focused M&E system, a field program should use a single M&E plan that has been developed and reviewed by its family planning, health, and conservation components. This collaborative effort maximizes the measurement of synergies and cross-sectoral integration, leveraging of data sources, M&E capacity, and the utility of the information.

Coordination between sectors is crucial in the collection of program information. Given limited resources and the shared goal of improving health and environmental outcomes, the importance that PHE data collection methods complement each other cannot be underestimated. PHE projects need to leverage the conservation-and-health-outcome data host organizations have already collected. Often, partners involved in implementing an integrated program do not sufficiently coordinate efforts to collect in-

formation that can show the benefits of integrated programming.

By the nature of PHE programs, M&E plans should include multiple data sources. That is, they should include indicators that call for data from each sector and include data from the program facilities, routine population surveillance, and special surveys. At the time of this publication, the PHE community had struggled to develop data sources that collect comprehensive data on PHE programs and measure the integration of those programs. In addition, few programs had the available resources to launch new data sources. To that end, programs should look outside their sector for data on selected indicators to show achievement.

Discussion between field and headquarters program managers and staff complete this participatory approach to PHE M&E. Central programs generally rely on the field to provide the information required to report to USAID and other donors. Therefore, it is important that a program's headquarters and field staff develop a clear understanding and consensus regarding the expectations of data collection and data quality. The successes and lessons learned from the communication and teamwork between central- and field-level operations, and between sectors, should be implemented regularly.

The M&E plan should clearly state the roles, responsibilities, and time lines for collecting data, as well as each indicator's data source. Partner roles in participatory M&E processes vary according to the level and type of data collection. The plan should also clearly state the roles and responsibilities for assuring high data quality. Partners and an external agency should routinely verify data for quality. **A strong M&E plan and system require data from various sources and levels, as well as a high level of cooperation and coordination among projects to provide valid evidence regarding program performance and the effects of integration.**

Your M&E working group will select a set of indicators based on the goals and objectives of the program, donor requirements, and special inquiries identified by stakeholders. The M&E plan should clearly state the sources for collecting data for these indicators and how often the data should be collected. Sources should vary between sectors and levels. That is, PHE programs should refer to data across sectors and at the program, population, and ecosystem levels. Leveraging data sources from across sectors increases efficiency and supports the participatory approach for PHE M&E.

PHE M&E is unique because it measures the ability of multiple sectors to

achieve common goals harmoniously. In addition to sharing information from data sources across sectors, PHE programs should strongly consider investing in measuring outcomes using surveys that measure behavior change with regard to health and the environment. For example, social behavioral information about environment-related practices as well as health-seeking behavior can be collected in one survey developed specifically for your project/program. Environmental data based on a specific geographic area can be linked to health behavior by using innovative methodologies such as geographic information systems. These interim investigations serve as valuable data sources for information regarding the strength of your integrated PHE program. The costs for special surveys and their benefits should be considered in the 5% to 10% M&E allocation of the total program budget. The design of these surveys will depend on several factors including the budget available, scale of the program, capacity of the organization, and outcomes of interest. These surveys should be conducted at strategic intervals during the project implementation cycle, as described in the M&E plan.

Steps for Developing and Implementing an M&E plan

This section provides general guidance on developing and implementing an M&E plan for PHE programs. These steps can be used for revising existing M&E plans or systems, as well as developing formal plans. M&E is an iterative process that should be integrated into a program's workflow. Plans should call for regularly collected and reported data; the plan itself should be periodically revised and harmonized with the program (logic) model or approach. In this way, the steps below can also be viewed as a cyclical process, with unique starting points for each program.

Step 1: Define the Purpose of the M&E and Performance Objectives

Who? – Following a participatory approach, create an M&E working group of project staff, field personnel, implementing partners, and central program managers committed to developing and implementing an M&E plan.

What? In the initial meetings for the M&E working group, discuss the program's conceptual approaches to PHE around the table. Illustrate the program's logical results chain, conceptual or results frameworks, answering such questions as, what are the explicit goals and objectives of the project?, what is the ultimate goal of our program and project and how does the integrated PHE approach help to achieve that goal?, and what are the project's inputs, processes, outputs, outcomes, and impacts? Dis-

cuss the purposes, benefits and challenges of M&E from each member's perspective. Finally, establish the goals for the project's M&E system and the results that the group seeks to measure (e.g., health, conservation, poverty alleviation, reproductive health service delivery, etc.). At this stage, the M&E working group should develop a conceptual framework that will guide the development of the M&E plan. Through this, the program managers can better illustrate what linkages are being made between sectors.

Why? – This discussion will set the stage for the M&E plan, ensure that all stakeholders have a clear and shared vision of the purpose, challenges, and project elements and goals for the M&E plan.

Value of a Conceptual Framework

The complexity and diversity of PHE programs make it difficult to capture all individual program components in one M&E framework. Programs often use different processes to arrive at the same outcome or use similar processes to arrive at different outcomes. A conceptual framework is useful for sorting out causal linkages — capturing the ways in which the process/activities of the program affect the knowledge, attitudes, skills, and behaviors of the target population. In this sense, a conceptual framework can help identify what evaluation information might be useful to the intended users of the information. A conceptual framework is particularly important for PHE programs as it serves as the basis for how the linked interventions of population, health, and environment sectors will lead to the long-term goal of the program.

Step 2: Resource Availability Mapping

Who? – Project manager, staff, and the M&E working group are involved.

What? – Working from the first set of meetings, the group can now assess the available resources to implement the M&E plan. The group, in consultation with appropriate program authority, should develop a M&E budget to cover the costs of capacity-building activities, data collection and processing expenses, and human resources. The general guidance is to allocate 5% to 10% of project funds to M&E activities.

Why? – A clear, explicit understanding of the resources available to implement an M&E system guides the processes of selecting indicators, developing instruments, collecting and analyzing data, and making data available for use. Institutional commitment to the M&E system ensures sustainability across time.

Table 2 – Illustrative Monitoring and Evaluation Budget

Activity	Amount in Dollars
Program manager time	\$x
Routine collection forms and duplication	\$x
Training staff in use of forms	\$x
Implementation of survey or special study	\$x
Special study consultant	\$x
Total estimated spending	\$x

Step 3: Identify Indicators, Methodological Approaches, and Data Sources

Who? Project staff and field personnel (and implementing partners, if applicable) are involved.

What? – Revisit the documents from the first set of meetings, and develop the list of program and project-appropriate indicators from those in this document. Compare that list with donor requirements, stakeholder requests, and information gaps. Select a core list of indicators based on the needs of all stakeholders. Although donor indicators may not always be directly useful for local program improvements, they are essential for reporting in order to maintain the program’s financial viability. Next, review the available data sources from which you can collect the necessary information. Then, consider if the same data sources could provide additional indicators that would serve more direct program needs. No program should attempt to collect information for all of the indicators in this guide. All programs should have a subset of these indicators in their M&E Plan. Next, develop a timeline of reporting requirements (donor, stakeholder, etc.), and map those dates with the data sources. This document can serve as a draft decision calendar. A decision calendar maps the programmatic decisions that need to be made over time (e.g., a year, a quarter, a five-year span) with the data and information required to make those decisions. Finally, making a time frame or task schedule can be especially useful in keeping the participatory M&E plan development moving forward. A schedule of tasks to be achieved provides transparency, accountability, and adequate resource allocation over the life of the system cycle. Table 3 on pages 36-37 shows an illustrative task schedule.

Why? – Key to data collection is detailed descriptions of indicators and ensuring that responsible parties have a stake in selection of appropriateness.

Step 4: Develop an Implementation and Data Dissemination and Use Plan

Who? – Project staff and field personnel, implementing partners, program managers are involved.

What? – Stakeholders meet regularly to discuss data collection, any issues with data quality, and how that information has been or could be used. In the beginning stages, the M&E working group should develop a data use plan, identify barriers to data use, and an information flow map to illustrate how data can be interpreted to make informed decisions. This meeting requires a clear understanding of what questions the indicators were selected to answer and how those answers can be applied to program protocol.

Why? – The ultimate purpose of M&E is to provide information that is used. Preparing for data use on a continuous basis assures that information is used to make informed decisions. This process also helps the group think strategically about different users' needs, what data to collect, and exactly how data can be used.

Step 5: Compile and Write the M&E Plan

Who? – Project M&E person, if applicable, or project leader (if responsible for M&E) is involved.

What? – Drawing from the information gathered from all the previous sessions, draft an M&E Plan that explicitly states all the material covered. Examples of sections to include are:

- a. introduction, including general project design, goals and objectives;
- b. purpose of the M&E plan;
- c. critical assumptions;
- d. frameworks – conceptual, logical, result chains, and/or strategic;
- e. indicators including definition, sources, etc.;
- f. data sources and data collection;
- g. evaluations/special studies – types and uses of evaluation bias, how information from evaluations relates to the regular monitoring, sampling, reference sources of types of evaluations;
- h. data use plans/reporting cycles, M&E system review meetings; and
- i. a plan to monitor the system itself and evaluate its effectiveness.

Why? – The M&E plan guides everyone involved in project monitoring. All participants should be held to the same set of indicators, definitions, and timelines; and roles and responsibilities should be clearly defined. The uses of data are clearly outlined. The M&E plan serves as an agreement

Table 3 – Illustrative Task Schedule

The timing and exact tasks for your project may differ from this task schedule and this should be altered to reflect the actuality of your PHE project.

Tasks	(YEAR 1)				(YEAR 2)			
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
<i>Develop M&E Working Group</i>								
Identify staff M&E leader	X							
Provide training for new M&E leader, working group	X	X						
Define working group goals, objectives and tasks	X							
Other					X			
<i>M&E Plan Development & Tools</i>								
Distribute or develop program logic model with M&E working group	X	X						
Review resources available for M&E implementation		X						
Develop indicator list, methodological approaches, and data sources		X						
Develop data quality assessment plan		X						
Introduce operations manual and provide training on data collection, data quality, and data use to program implementers		X	X					
Other								
<i>Data Collection & Analysis</i>								
<i>Program-based data</i>								
Create indicator collection forms		X						
Finalize data collection forms with M&E working group		X						

Other								
Population-based data								
List available and useful data sources and collection dates			X					
Develop survey instrument			X					
Implement survey in the field					X			
Other								
Information Products								
Donor reports			X			X		
Other								
Data Dissemination								
When does each product get disseminated?				X			X	
Other								

Note: This schedule represents a partial list of tasks that need to be completed.

among stakeholders and a resource that provides clarity and transparency to the entire process.

Step 6: Use Data for Decision-Making and Review M&E Plan

Who? – Project managers are involved, with feedback from staff and program managers.

What? – The M&E working group should periodically review the plan and update it based on the successes and shortfalls of system performance. Monitoring and evaluating a project should allow users to see operational problems and program designs that need correction. The group should solicit feedback from data gatherers, processors, and information users. The group should also communicate how data can be used to inform the direction of project implementation with project staff and stakeholders.

Why? – M&E should promote a process of using information. The M&E plan is a living document that is only useful as long as it reflects project implementation and reporting needs. Data should be used to adapt the project accordingly; regular monitoring can lead to the necessity to develop special studies and evaluations to answer implementation questions.

Methods and Data Sources Used in this Guide

The following table provides an overview of each measurement level used in this guide, as well as related data sources and time frames for collection. Some examples of data sources may serve both program- and population-level indicators. These data sources may provide various pieces of information for several indicators. The indicators selected in these categories do not measure whether the program has had an impact. It is not the indicators but the evaluation design that would measure the impact of the program. The table has been generalized for a wide variety of programs with different objectives and goals.

Table 4 – Data Types by Level of Measurement

Level of Measurement	Methods	Data Sources	Time Frame
Inputs <i>Program-based measures</i>	<ol style="list-style-type: none"> 1. Trend analysis 2. Rapid appraisal 	<ol style="list-style-type: none"> 1. Service statistics 2. Project records 3. Key informant interviews 4. Direct observation 5. Facility surveys 6. Focus groups 	Progress within six months of project start and routinely collected every one to three months throughout project cycle
Process <i>Program-based measures</i>	<ol style="list-style-type: none"> 1. Trend analysis 2. Rapid appraisal 	<ol style="list-style-type: none"> 1. Service statistics 2. Project records 3. Key informant interviews 4. Direct observation 5. Facility surveys 6. Focus groups 	First six months to one year of program implementation
Outputs <i>Program-based measures</i>	<ol style="list-style-type: none"> 1. Trend analysis 2. Transect survey 	<ol style="list-style-type: none"> 1. Service statistics 2. Project records 3. Direct observation 	One to two years
Outcomes (short-term or long-term) <i>Population-based or habitat-based measures</i>	<ol style="list-style-type: none"> 1. Population-based surveys 2. Transect survey 3. Mapping 	<ol style="list-style-type: none"> 1. Questionnaires 2. Survey forms 3. Global positioning systems, fly-overs 4. Legal records 5. Log books 	Two to three years for short-term and three to five years or longer for long-term

Trend Analysis

Data sources — service statistics, project records

Most programs have a system or protocol for collecting data, either for the purposes of reporting to donors or to improve the program. Even programs that do not have a formal M&E system usually collect data on provided services. These data sources include health-facility records (e.g., patient records, stock inventories, training-course evaluations, budgets, strategic plans, operational plans, M&E plans, etc.) and environment forms (e.g., project logbooks and forms from educational sessions, natural resource management plan development, etc.) that can be compiled to generate information regarding service statistics and logistics data.

Groups developing or revising M&E plans should review all forms within the program that may collect data related to the selected indicators. Some forms may collect only a part of the data required by indicators, while others may not be collected or collated in a timely manner to meet reporting requirements. Also, it may benefit the group to become familiar with the program-level data collection processes and forms in other sectors (i.e., health workers should learn about environment data collection and vice versa) to minimize redundancies and focus on complementary methods of data collection. The M&E working group should work closely with program implementers and managers to revise these forms so that complete information can be collected in a cost-efficient and time-efficient way.

Program monitoring data can examine progress in implementation over time. Programs may select key indicators based on stakeholder interest and compare the information. From this comparison, program teams can investigate changes in program operations, budget, and other factors to account for that change.

How to Use Service Statistics for M&E Purposes

Define the indicators to be measured from service statistics:

- Redesign the form to yield data of interest, or ensure the form collects information of interest.
- Obtain authorization to incorporate changes into the information system.
- Train appropriate staff in the use of the revised instrument.
- Ensure the quality of the data.
- Process the information manually or by computer.

Present the information in a form that is easy to understand.

Rapid Appraisal (Qualitative)

Data sources — direct observation, focus groups, key informant interviews, facility surveys

While formal surveys may be conducted at long intervals (i.e., every five years and over several months), rapid appraisal methods can provide interim information on program performance. Rapid appraisal methods are quick, low-cost ways to gather information from stakeholders to respond to decision-makers. They generally require four to six weeks, depending on the population size, location and the number of sites observed. These methods provide qualitative information that provides context for any quantitative data collected, to further understand people's values, motivations, and reactions. This category includes direct observation, focus groups, key informant interviews, and facility surveys.

Key informant and in-depth interviews tend to be open-ended and range from a total lack of structure and minimum control over a respondent's answers, to semi-structured interviews based on a written list of questions and topics that need to be covered in a particular order, and fully-structured interview techniques that may include tasks that require respondents to rate or rank order a list of things. Open-ended questions and probes are used to elicit respondent's experiences, opinions, feelings, and knowledge.

Focus groups are a particular type of in-depth interview that involve a small group of people (usually six to 12) and a moderator to discuss a particular topic. Focus groups are less expensive than surveys to conduct, and provide insights into how people feel about a particular issue or behavior and why they feel that way.

Direct observation entails fieldwork descriptions of activities, behaviors, actions, conversations, interpersonal reactions, and organizational and community processes. Data consist of detailed descriptions that include the context in which the observations were made. Direct observations require the investigator to engage personally in all or part of the program under study or participate as a regular member or client, as a participant observer, to gain greater insights than could be obtained from a survey questionnaire.

While focus groups and key informant interviews require questioning and facilitating conversation with people, direct observation of conditions either in the environment (i.e., counting species) or as a part of a population-based survey (i.e., observing the availability of hand-washing supplies

in a household) do not necessarily require skills in questioning. A facility survey may involve a combination of questioning staff and observing conditions in the facility or provision of services.

Population-Based Surveys

Data sources — questionnaires (sometimes includes direct observation)

Population-based surveys collect information on key topics from a representative sample of people or households, and generalize that information to the entire population. One example of a population-based survey at the national level is the Demographic and Health Survey. Surveys may also be conducted at the regional or district level, or among a target populations (e.g., youth, most-at-risk population, women of reproductive age).

Most PHE projects/programs target either a particular demographic group or a sub-national or sub-regional population. Although large population-based surveys draw from a population larger than a typical PHE program's clientele, they can provide PHE programs with information on output-level and outcome-level indicators. Population-based surveys' structured interviews involve developing questionnaires and a sampling methodology, and pose closed questions to garner quantitative data that are representative at the population level for outputs and outcomes (for PHE programs, population level refers to the local level for the population targeted by the project). The data need to be collected and analyzed with the highest degree of integrity and may require special expertise. Although some population-based surveys conducted by PHE programs may not be large in scale, a specialized agency or institution should be contracted to perform surveys at the population level to avoid bias in the data collection.

Steps in Carrying Out a Survey Using a Structured Questionnaire

1. Plan the survey

- Develop the questionnaire.
- Review the questionnaire with experts and stakeholders and incorporate their revisions.
- Review the study protocol (including the objective, target population, sample design, sample size, survey instruments, and timeline).
- Have the study approved by the appropriate national ethics board.
- Select and train the interviewers.

2. Carry out the fieldwork

- Conduct a pre-test in the field (among respondents similar to the population to be interviewed).
- Modify the instruments based on the pre-test.
- Coordinate logistical aspects for the fieldwork.
- Collect the data.

3. Process and analyze the data

- Review the questionnaires while the interviewers are still on location.
- Code the data.
- Enter the data into the computer (with a program such as Epi-Info or SPSS).
- Prepare the tables of results, according to the analysis plan.

4. Produce the results and disseminate the report

- Prepare a final report.
- Share the results with people responsible for the project and other interested parties.

Transect Survey

Data sources — survey form (mainly includes direct observation)

A transect survey can measure the area of the habitat a project is targeting in its intervention. Transect routes should evenly sample the habitat types and natural resource management activity on sites. As much as possible, each survey should take place at the same of time of day, weather conditions, location, overall methodology, and observer training level so that these factors do not unevenly influence recorded results. This data collection method can produce information for both quantitative (species counts) and qualitative (condition of habitat) aspects of the natural environment.

Transects should be done by walking or driving the transect line in a given direction in a straight line. Data collectors should sample points at pre-determined distances (e.g., approximately every 100 m) for a selected total distance (e.g., 1 or 2 km per transect). Data collectors should travel

the grid or transect at a slow, steady pace and take the same route for each survey. Transects are divided into sections corresponding to different habitat or management units. One method of data collection is to mark off targeted fixed-route grids/transects to survey several times during each two or three-year period. Species are recorded along the route on a regular (monthly or yearly) basis. Data collectors should never wait at “hotspots” where they have seen species previously, as this will lead to bias. A standardized field recording form should be used to record observations.

The time of day of the transect walks should also be held constant for comparison purposes. The grid/transect should be surveyed by trained observers at pre-determined times of the day or night (depending on the species) at the same times each year. Surveys should only take place during pre-specified “good” weather conditions, which will depend on the target species. Variations in species distribution and migration/hibernation behaviors must be taken into account when deciding when and where to conduct field surveys. The goal is to avoid biasing data collection by conducting a survey, for example, during weather conditions that would cause the selected species not to be active and out in their normal habitat.

Marine sampling may be done in a similar way by using snorkeling, scuba-diving, boat surveys, or for large marine mammals, aerial surveys. Some possible methodologies include use of quadrates, band transects, random-point contact plots, roving diver fish counts, artificial recruitment, size frequency measurements, and aerial photos.

Data collection may require several people skilled in identifying species’ normal ranges or habitats. Necessary materials may include spotting scopes, spotlights, night-vision goggles, binoculars, cameras, scuba-diving equipment, global positioning system (GPS) equipment, compasses, standardized notebooks to record observations, surveyor tape measures, diameter tape measures, and a biodegradable toprofil line (a thread measuring device with a counter that is unreel).

Mapping

Data sources — aerial photographs, global positioning systems, satellite images

Program staff can use maps to measure changes in land use, land status, species location and species migration. The various technologies for mapping interventions and tracking indicators require different levels of knowledge and expertise. Taking aerial photographs, or using GPS or satellite images

of the targeted terrestrial or marine area help programs obtain more accurate and meaningful data collection. Some rural communities use hand-drawn maps to identify places of interest and important community structures. Other methods that can take advantage of mapping include selected transects, key territories and identifying breeding sites with GPS so the exact site can be identified at a future date.

Generally speaking, the environmental community has more experience and expertise with using mapping for data collection than the health and population technical sectors. Leveraging expertise across sectors can be particularly useful to integrated programs in tracking the changes in outcomes geographically and over time. Mapping provides an opportunity to link the outcomes in environmental change with the changes in behaviors and knowledge of the community living in that habitat. In the last decade, the public health community had gained interest in spatial analysis, a useful method for presenting changes in health outcomes. PHE programs can take advantage of the interest in the public health community for spatially-related data with the vast expertise in the environment community for spatial analysis.



Part Three | Indicators

Population Sector Indicators: *Family Planning and Reproductive Health*

Population sector activities within PHE programs aim to improve and sustain voluntary family planning and reproductive health services and use. Population programs need to collect and assess information about two broad, sometimes overlapping areas: health facilities and relevant populations. The first area is important because facility quality and staff training, access, and population use of health facilities all strongly influence the overall health of a population. Population programs not only assess a population’s physical health, but also that population’s attitudes, knowledge, and behaviors about a specific health issue, as well as promote gender equality and male inclusion in discussions about contraception. An area of improving and sustaining voluntary family planning and reproductive health services that is particularly relevant to PHE programs’ work is a focus on providing access to underserved communities.

While the ultimate long-term measurement in population programs is the total fertility rate, the indicators in this guide focus on measuring variables that can be measured for results over a shorter period of time but are equally important. Many of the indicators in this section may be valuable for population-sector M&E; however, programs that have a focused nature or that face limited budgets should concentrate on measuring indicators that best fit their needs.

Table 5 – Population Indicators

Outputs <i>Program-Based</i>	Outcomes <i>Population-Based</i>
1. Percent of program staff trained to work with or provide reproductive health services to adolescents 2. Percentage of women of reproductive age (15–49) who were clients of a community-based contraceptive distributor in the last year 3. Couple-years of protection (CYP) 4. Average household distance/time to the nearest health center 5. Percent of skilled health personnel knowledgeable in obstetric warning signs	6. Number of acceptors new to modern contraception 7. Contraceptive prevalence rate 8. Percent of deliveries occurring in a health facility 9. Percent of births attended by skilled health personnel 10. Percent of women attended at least once during pregnancy for reasons related to pregnancy

1 PERCENT OF PROGRAM STAFF TRAINED TO WORK WITH OR PROVIDE REPRODUCTIVE HEALTH SERVICES TO ADOLESCENTS

LEVEL OF MEASUREMENT: Output.

DEFINITION: Staff members are considered “youth-friendly” if they have the ability to provide services and an environment that targets young audiences. Youth-friendly training generally includes learning how to create a service environment that will attract and retain a youth clientele. This includes space or rooms dedicated to adolescent reproductive health services; staff who are competent in policies and procedures to ensure privacy and confidentiality; peer educators who stay on-site during hours specified for provision of services to youth, and use of non-judgmental approaches to providing services to youth and accept drop-in clients. A staff member would need to go through specific training for working with youth to be counted in this indicator. The denominator should include all staff who work in the target area during the reference period (semi-annually or annually), even staff who work part-time.

Calculation

$$\frac{\text{\# of program staff trained to work with or provide reproductive health services to adolescents during the reference period}}{\text{total \# of health service providers in the target area during the reference period}} \times 100$$

DISAGGREGATE: None.

PURPOSE: Reproductive health services have traditionally been designed for older, married women. Increasing the number of health providers trained to work with youth may increase the chance that youth will take advantage of the basic reproductive health services they need.

DATA SOURCES: Project records.

TIME FRAME: Semi-annually; annually.

DATA COLLECTION CONSIDERATIONS: Specific topics related to adolescent reproductive health, such as sexual health education and peer dynamics, should be covered in the training. Use of a pre- and post-test will assist in determining the staff’s level of understanding.

STRENGTHS & LIMITATIONS: This indicator targets the service improvement for an audience that has a strong, often unmet need for reproductive health services. However, training does not indicate whether or not providers give adequate care.

2 PERCENT OF WOMEN OF REPRODUCTIVE AGE (15-49) WHO WERE CLIENTS OF A COMMUNITY-BASED CONTRACEPTIVE DISTRIBUTOR IN THE LAST YEAR

LEVEL OF MEASUREMENT: Output.

DEFINITION: This indicator measures how well community-based distribution of contraception provides coverage of family planning services to an area. In the context of PHE programs, community-based distribution means that the contraceptives are sold at a point that is not a traditional health facility, such as a clinic or hospital. Community-based distribution is generally through a local store or commercial site or an individual at a non-commercial site, as well as other variations that are community-based. As measured in this indicator, a client is a woman who receives contraception from the community-based distributor (CBD), but does not include a woman who only talks with the CBD about contraceptive methods. The method of contraception here can include any method – modern or traditional.

Calculation

$$\frac{\text{total \# of women clients age 15-49 of community-based distributors in the target area in the last year}}{\text{total \# of women age 15-49 living in the target area in the last year}} \times 100$$

DISAGGREGATE: By target community.

PURPOSE: The aims of the CBD program are to increase contraceptive use by increasing access and raising demand through information, education, and communication (EIC) activities. For PHE programs, community volunteers are usually recruited to be community-based distributors, making CBD programs especially effective in rural and isolated communities where demand is limited and access to alternative methods is low.

DATA SOURCES: Population-based survey or project records.

TIME FRAME: Annually for project records and every three to five years for surveys.

DATA COLLECTION CONSIDERATIONS: The questionnaire for surveying women in the target area should include the type of commodities/methods received in the previous time period year.

STRENGTHS & LIMITATIONS: CBDs tend to be low-volume independent distributors in isolated and sometimes difficult-to-reach areas, creating the need for field-workers to re-supply these posts frequently and provide supervision and continuous training in contraceptive methods use and risks.

3 COUPLE-YEARS OF PROTECTION

LEVEL OF MEASUREMENT: Output.

DEFINITION: Couple-years of protection (CYP) is the estimated protection provided by family planning services during a one-year period based upon the volume of all contraceptives sold or distributed to clients during that period.

Table 6: How to Calculate CYP

Calculation: Multiply the quantity of each method distributed to clients by the conversion factor below to obtain a CYP per method. Then sum each CYP to obtain a total CYP figure.

Method	Units per CYP	Conversion Factor
Oral contraceptives	15 cycles per CYP	$\frac{1}{15}$
Condoms	120 units per CYP	$\frac{1}{120}$
Female condoms	120 units per CYP	$\frac{1}{120}$
Vaginal foaming tablets	120 units per CYP	$\frac{1}{120}$
Depo Provera injectable	4 doses per CYP	$\frac{1}{4}$
Noristerat Injectable	6 doses per CYP	$\frac{1}{6}$
Cyclofem monthly injectable	13 doses per CYP	$\frac{1}{13}$
Emergency contraceptive pills	20 doses per CYP	$\frac{1}{20}$
Copper-T380-A IUD	3.5 CYP per IUD inserted	3.5
Norplant implant	3.5 CYP per Implant	3.5
Implanon implant	2 CYP per Implant	2
Jadelle implant	3.5 CYP per Implant	3.5
Natural family planning (i.e. standard days method)	2 CYP per trained, confirmed adopter	2
Lactational amenorrhea method (LAM)	4 active users per CYP (or 0.25 CYP per user)	0.25
Sterilization (male & female)		
Asia	10 CYP	10
Latin America	10 CYP	10
Africa	8 CYP	8
Near East/North Africa	8 CYP	6

Example: A facility that distributed the following family planning services			
Method	Quantity	Conversion Factor	CYP
Oral contraceptives	4,321	$\frac{1}{15}$	288.1
Condoms	9,900	$\frac{1}{120}$	82.5
IUDs	80	3.5	280.0
Total			650.6

DISAGGREGATE: By method.

PURPOSE: CYP is a simple, inexpensive way to measure program activity volume using routinely collected data. CYP can monitor progress of contraceptive service delivery at the program and project levels.

DATA SOURCES: Service statistics.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Standardized forms, facility “log books” and commodities tracking are necessary for this indicator calculation. Regarding the calculation of long-term methods, most programs credit the entire amount to the calendar year in which the client accepted the method. For example, if a family planning program in Asia performed 100 voluntary sterilization procedures in a given year, it would credit all 1000 CYP (100 procedures x 10 years each) to that calendar year, even though the protection from those programs would in fact be realized over that year and the next nine years.

STRENGTHS & LIMITATIONS: CYP can be obtained from different service delivery mechanisms. However, the value of this indicator can be difficult to understand. CYP data do not provide individual contraceptive use rates. The validity of the conversion factors is still debated and the number of people represented is not evident in this calculation.

4 AVERAGE HOUSEHOLD DISTANCE/TIME TO THE NEAREST HEALTH CENTER

LEVEL OF MEASUREMENT: Output.

DEFINITION: This is the average time or distance from a respondent's place of residence to the nearest service delivery site offering the measured service. The services included in this measurement should be determined in advance by the project, depending on the project's objectives.

DISAGGREGATE: By services offered (if desired).

PURPOSE: Distance to a health facility is often a major factor determining whether or not people truly have access to that facility, especially when transport is not easily available.

DATA SOURCES: GPS or mapping the routes can calculate the distance between health centers and communities. A less reliable option is using a population-based survey where household members are asked their distance or time it takes them to reach the nearest health center that provides the measured service.

TIME FRAME: Every one to two years.

DATA COLLECTION CONSIDERATIONS: This indicator is useful for demonstrating the effects of providing health services in remote, underserved areas. These areas may contain relatively few people, but the impact of providing services there may be great because there were no or few pre-existing services. In these instances, the PHE project should compare the distance or traveling time it previously took the target population to get to outside health centers with the calculation of the distance or average time it takes the target population to get to the newly established health center.

STRENGTHS & LIMITATIONS: Community members may visit distant health facilities in order to maintain confidentiality. The expense and effort required to obtain this indicator may mean it can only be collected every few years.

5 PERCENT OF SKILLED HEALTH PERSONNEL KNOWLEDGEABLE IN OBSTETRIC WARNING SIGNS

LEVEL OF MEASUREMENT: Output.

DEFINITION: Skilled health personnel include midwives, doctors, and nurses with midwifery and life-saving skills. Traditional birth attendants (TBAs) are typically not included in this definition. Staff members are considered “knowledgeable” if they can name at least three of the following warning signs of obstetric complications:

1. bleeding
2. labor lasting more than 12 hours
3. placenta retained more than one hour
4. convulsions or swelling of the hands or face (eclampsia)
5. fever and vaginal discharge (puerperal sepsis)

Calculation

$$\frac{\text{\# of skilled health personnel who know at least three warning signs}}{\text{total \# of skilled health personnel interviewed}} \times 100$$

DISAGGREGATE: None.

PURPOSE: This indicator is used to assess the knowledge of skilled health personnel as the basis for their ability to make timely referrals to obstetric services. TBAs are not usually included for this indicator; but because PHE projects often train TBAs, TBA numbers may be tracked separately.

DATA SOURCES: Health worker interviews.

TIME FRAME: Annually for training records. Every two to five years for surveys.

DATA COLLECTION CONSIDERATIONS: Ensuring that obstetric warning signs are defined in advance and used consistently for tracking this indicator over time is essential to the validity of this figure.

STRENGTHS & LIMITATIONS: Knowledge of obstetric warning signs does not indicate that health personnel are knowledgeable about the severity of warning signs or that they know how to deal with the complications.

6 NUMBER OF ACCEPTORS NEW TO MODERN CONTRACEPTION

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: For this indicator, an acceptor is a person using any modern contraceptive method for the first time in his or her life within the last year. Modern contraceptive methods include IUDs, the pill, implants, injections, condoms, spermicides, diaphragms, tubal ligation, and vasectomy.

DISAGGREGATE: By method (if desired).

PURPOSE: This indicator measures a program's ability to attract new clients from an untapped segment of the population.

DATA SOURCES: Usually service statistics; occasionally from population-based surveys.

TIME FRAME: Annually using service statistics; every two to five years using a population-based survey.

DATA COLLECTION CONSIDERATIONS: Program personnel can disaggregate service statistics by key variables (age, sex, place of residence, or other factors deemed relevant in the country of context).

STRENGTHS & LIMITATIONS: Defining this indicator in terms of first-time use in the life of an individual removes the ambiguity associated with the more general term "new acceptor" that can include individuals who are new to a clinic or a method but not to modern contraceptive use. However, this indicator measures absolute numbers, not the proportion of the population. It does not measure how long contraceptive use continues or if methods are used properly.

7 CONTRACEPTIVE PREVALENCE RATE

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: Contraceptive prevalence rate (CPR) is defined as the percent of reproductive-age women (ages 15–49 years) who are using a contraceptive method at a particular point in time. This is almost always reported for women married or in a sexual union. Generally, this includes all contraceptive methods, modern and traditional, but it may include modern methods only. The program manager should decide in advance whether any method or just modern methods will be included in calculating this indicator. The World Health Organization (WHO) defines modern contraceptive methods as female and male sterilization, injectable and oral hormones, intrauterine devices, diaphragms, hormonal implants, spermicides, and condoms. Traditional methods include the calendar method (or rhythm), withdrawal, abstinence, and lactational amenorrhea (LAM).

Calculation

$$\frac{\text{\# of partnered women (married or in union) of reproductive age using a contraceptive method}}{\text{total \# of partnered women (married or in union) of reproductive age}} \times 100$$

DISAGGREGATE: By modern and traditional methods.

PURPOSE: CPR measures population coverage of contraceptive use, taking all sources of supply and contraceptive methods into account.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: In countries with a widespread practice of sexual activity outside marriage or stable sexual unions, a prevalence estimate based on women in unions only would ignore a considerable number of current users of contraception.

STRENGTHS & LIMITATIONS: This indicator is widely used. To calculate a true contraceptive rate, the denominator should include only women at risk of pregnancy, which is difficult to measure. This indicator does not measure how long women have been using contraceptives or if they are using them correctly.

8 PERCENT OF DELIVERIES OCCURRING IN A HEALTH FACILITY

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: A health facility is defined as a permanent building where trained health providers work with the primary intent of practicing preventive or curative medicine.

Calculation

$$\frac{\text{total \# of deliveries occurring in a health facility in a given period}}{\text{total \# of births within a specified area in the same period}} \times 100$$

Using all births to calculate this indicator is ideal, but using only live births is also acceptable. Where data on the number of live births are unavailable, calculate total expected births by multiplying population by the crude birth rate. If the crude birth rate is unknown, WHO recommends using 3.5% of the total population as an estimate of the number of pregnant women.

DISAGGREGATE: None.

PURPOSE: Institutionalized deliveries are associated with reduced maternal mortality and increased infant survival rates. Many PHE projects train personnel to increase the number of women seeking medical assistance during normal childbirth.

DATA SOURCES: Service statistics; population-based surveys.

TIME FRAME: Annually using service statistics; every three to five years using a population-based survey.

DATA COLLECTION CONSIDERATIONS: Frequent surveys are generally unreliable because survey periods may overlap; for international comparisons, a reference period of three to five years is probably sufficient.

STRENGTHS & LIMITATIONS: This indicator is easily calculated from population-based surveys. This indicator is birth-based so it is representative of births. The sample will over-represent women with multiple births in the reference period. These women are also more likely to have other risk factors and lower rates of health facility use. The indicator will therefore underestimate the percentage of women delivering in a health facility.

9 PERCENT OF BIRTHS ATTENDED BY SKILLED HEALTH PERSONNEL

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: “Skilled health personnel” are professionals with defined skills and knowledge that enable them to provide safe health care during child birth. Skilled health personnel includes doctors, midwives, and nurses with midwifery and life-saving skills. TBAs are generally not included in this indicator. However, because PHE projects often train TBAs, TBA numbers may be tracked for other purposes.

Calculation

$$\frac{\text{\# of births attended by skilled personnel during the reference period}}{\text{total \# of live births occurring within the reference period}} \times 100$$

Using all births to calculate this indicator is ideal, but using only live births is also acceptable. Where data on the number of live births are available, calculate total expected births by multiplying population by the crude birth rate. If the crude birth rate is unknown, WHO recommends using 3.5% of the total population as an estimate of the number of pregnant women.

DISAGGREGATE: By geographic area or by type of attendant.

PURPOSE: This indicator provides information on women’s use of delivery services. Many argue that increasing the proportion of deliveries with a skilled attendant is the single most critical intervention for reducing maternal mortality. It is also important for reducing newborn mortality.

DATA SOURCES: Service statistics or population-based surveys.

TIME FRAME: Annually using service statistics; every three to five years using a population-based survey.

DATA COLLECTION CONSIDERATIONS: Both the numerator and denominator should fall within the same defined period of time. Frequent surveys are generally unreliable because survey periods may overlap. For international comparisons, a reference period of three to five years is probably sufficient.

STRENGTHS & LIMITATIONS: Differences in definitions of “skilled health attendant” and other terms may lead to discrepancies between countries. Mothers who self-report for this indicator may not accurately identify who is or isn’t a skilled health attendant. This indicator does not include stillbirths.

10 PERCENT OF WOMEN ATTENDED AT LEAST ONCE DURING PREGNANCY FOR REASONS RELATED TO PREGNANCY

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: The percent of women attended at least once during pregnancy by skilled health personnel for reasons related to pregnancy.

Calculation

$$\frac{\text{\# of pregnant women attended by skilled personnel for pregnancy-related reasons during a specified period}}{\text{total \# of live births occurring within the specified time period}} \times 100$$

DISAGGREGATE: None.

PURPOSE: This indicator provides information about women's use of antenatal care services.

DATA SOURCES: Service statistics or population-based surveys.

TIME FRAME: Annually using service statistics; every two to five years using a population-based survey.

DATA COLLECTION CONSIDERATIONS: The number of live births is a proxy for the numbers of all women who need antenatal care. All births should be included in the denominator; however information about non-live births is difficult to obtain, so the number of live births may be substituted in its place. Both numerator and denominator should fall within the same time period. Where information about the total number of live births is not available, the total estimated live births can be estimated by multiplying the target area's population by the crude birth rate. In settings where the crude birth rate is unknown, WHO recommends using 3.5% of the total population as an estimate of pregnant women (i.e. number of live births or pregnant women = total population x .035)

STRENGTHS & LIMITATIONS: This indicator does not capture detailed information about the reasons or timing of visits or quality of care. Antenatal care services may not exist in some rural or remote regions where PHE programs work.

Health Indicators: *Child Survival and Environmental Health*

Child survival and environmental health activities work toward reducing child morbidity, mortality, and disease incidence. Child health and survival has been a focus for many large-scale international programs, including the Millennium Development Goals, the Integrated Management of Childhood Illness strategy, the Global Alliance for Vaccines and Immunization, and the Roll Back Malaria initiative.

Many communities served by PHE projects have identified child health and survival as a priority. The indicators in this section have been chosen to measure indicators at the input, process, output, and short- to medium-term outcome levels rather than the long-term outcomes of disease incidence and infant and child mortality. Together, these indicators cover a broad range of environmental and child health activities. Most PHE programs work on achieving the shorter-term outcomes in a smaller community and contribute to a larger effort in the area to improve child health. Depending on their focus and resources, PHE programs can choose the indicators most appropriate for their own work.

Outputs	Outcomes	
1. Number of doses of tetanus vaccine distributed	5. Percent of pregnant women receiving at least two doses of tetanus toxoid vaccine	9. Percent of households using an improved toilet facility
2. Number of insecticide-treated bed nets distributed	6. Percent of children aged 12–23 months fully immunized before 12 months	10. Percent of households using soap in last 24 hours
3. Number of packets of oral rehydration salts distributed	7. Percent of households with access to an improved source of drinking water	11. Percent of households storing drinking water safely
4. Number of safe water storage vessels distributed	8. Time spent by household members to collect water	12. Percent of children under five years who slept under an insecticide-treated bed net the previous night
		13. Oral rehydration therapy use rate

1 NUMBER OF DOSES OF TETANUS VACCINE DISTRIBUTED

LEVEL OF MEASUREMENT: Output.

DEFINITION: This involves the total number of doses of tetanus vaccine distributed by a program or facility in a specified period. These doses include the total of any of tetanus-toxoid (TT) or tetanus-diphtheria toxoid (Td) vaccines. The period of time should be defined in advance. The information is usually collected monthly at the facility and aggregated quarterly by the project manager.

DISAGGREGATE: None, or if desired, by facility/distributor.

PURPOSE: Neonatal tetanus kills 200,000 infants in the developing world every year. This indicator can measure program or clinic capacity to promote prevention of this disease. PHE projects frequently distribute immunizations through facility-based and community-based methods.

DATA SOURCES: Service statistics.

TIME FRAME: Monthly, quarterly.

DATA COLLECTION CONSIDERATIONS: Doses of tetanus vaccine are given to women of child-bearing age and to pregnant women without previous exposure to TT, Td, or diphtheria, tetanus, and pertussis (DTP) vaccines. This indicator can be used as a template for measuring other vaccines distributed by the project, substituting tetanus with the vaccine of interest.

STRENGTHS & LIMITATIONS: Data for this indicator are easily collected, and the indicator can quickly estimate a program or facility's reach in a given region. However, this indicator does not measure whether vaccines were administered correctly or the proportion of targeted populations reached.

2 NUMBER OF INSECTICIDE-TREATED BED NETS DISTRIBUTED

LEVEL OF MEASUREMENT: Output.

DEFINITION: This involves the number of insecticide-treated bed nets distributed by the project in a region in a given reference period (e.g., quarterly). Insecticide-treated bed nets have been dipped in an insecticide effective against local malaria-causing mosquitoes.

DISAGGREGATE: None or by facility/distributor, if desired.

PURPOSE: Insecticide-treated bed nets are an inexpensive and effective way to reduce malaria transmission. Calculating the number of bed nets distributed is an important part of assessing the capacity of malaria prevention programs.

DATA SOURCES: Service statistics.

TIME FRAME: Monthly, quarterly.

DATA COLLECTION CONSIDERATIONS: Distribution data are sometimes collected at the warehouse level and sometimes collected at the distributor level. There is a need to be clear about the level of the data. Distributor level data is preferred over warehouse level.

STRENGTHS & LIMITATIONS: Distribution data are much easier to collect than actual use of bed nets. However, this indicator does not measure use of bed nets or access to bed nets by groups that need them. This indicator will not estimate the proportion of bed nets distributed or used in a region; neither will it estimate distribution in relation to need, which varies from season to season and among population groups (i.e., infants and pregnant women). If data are collected at the warehouse level, then the indicator only measures the distribution to distributors, not to the target population.

3 NUMBER OF PACKETS OF ORAL REHYDRATION SALTS DISTRIBUTED

LEVEL OF MEASUREMENT: Output.

DEFINITION: This involves the number of oral rehydration salts (ORS) packets distributed by the project over a given period. ORS contain a balanced mixture of glucose and electrolytes to prevent and treat dehydration, potassium depletion, and base deficit due to diarrhea. When ORS packets are dissolved in water, the mixture is called an oral rehydration solution.

DISAGGREGATE: None; or if desired, by facility/distributor.

PURPOSE: Diarrhea is a principal cause of morbidity and mortality among children in developing countries. Diarrhea is defined as three or more loose or watery stools during a 24-hour period.

DATA SOURCES: Service statistics.

TIME FRAME: Monthly, quarterly.

DATA COLLECTION CONSIDERATIONS: In some cases, a homemade mixture similar to packaged ORS may be used by households for oral rehydration therapy. Use of the homemade mixture would not be included in this indicator as it is not a product that the project has distributed to clients. Use of the packet does not measure whether the ORS was used with safe water.

STRENGTHS & LIMITATIONS: This indicator can measure the capacity of regional diarrhea-control programs and the number of ORS packets provided to a region but does not measure use of or access to ORS. The indicator will not estimate the proportion of packets distributed in relation to the population or in relation to the needs of the region.

4 NUMBER OF SAFE WATER STORAGE VESSELS DISTRIBUTED

LEVEL OF MEASUREMENT: Output.

DEFINITION: This measures the number of safe water storage vessels distributed in a region over a given period. Safe storage vessels should either have a narrow neck and be covered, or they should store water where household members can not serve themselves directly (such as roof tanks or cisterns).

DISAGGREGATE: By facility/distributor, if desired.

PURPOSE: Water must be stored safely to avoid contamination and the spread of infection. Some households may not have access to containers or vessels to store water where it can be free from dirt or other contamination.

DATA SOURCES: Service statistics.

TIME FRAME: Monthly, quarterly.

DATA COLLECTION CONSIDERATIONS: It is useful to identify storage containers from which water is removed by dipping, which are not considered to be adequate for safe water storage. Dipping introduces objects (such as a ladle, cup, or dipper), and often hands that hold these objects, into stored water, thereby negating the benefits of a cover.

STRENGTHS & LIMITATIONS: This indicator can be used to measure the capacity of safe water distribution efforts cheaply, as well as the number of water storage vessels provided to a region. However, people must have access to safe water to begin with for safe water storage vessels to have any impact; water safety also depends on proper use and knowledge, which this indicator does not measure. This indicator does not estimate the proportion of storage vessels distributed in relation to the population.

5 PERCENT OF PREGNANT WOMEN RECEIVING AT LEAST TWO DOSES OF TETANUS TOXOID VACCINE

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: A newborn's protection against neonatal tetanus is determined by the mother. To protect newborns, women previously not immunized should receive two doses of TT or Td vaccine during their first pregnancy and one dose of TT or Td during each subsequent pregnancy up to a maximum of five doses. Td provides identical tetanus protection to TT and provides protection against diphtheria as well.

Calculation

$$\frac{\text{\# of pregnant women who have received two or more doses of TT or Td vaccines}}{\text{total \# of live births}} \times 100$$

DISAGGREGATE: By facility or target area, if desired.

PURPOSE: Neonatal tetanus is responsible for 14% of all neonatal deaths in the developing world. A child is considered fully protected if her/his mother has had at least two TT or Td doses within the past three years or has had five lifetime TT or Td doses.

DATA SOURCES: Population-based surveys or service statistics.

TIME FRAME: Annually using service statistics; every two to five years using a population-based survey.

DATA COLLECTION CONSIDERATIONS: When using service statistics to calculate this indicator, the reference period is usually the previous 12 months, with the total number of doses given as the numerator and the total number of live births in the previous 12 months used as the denominator. When collecting this indicator using a population-based survey, the numerator is the number of women giving birth during a reference period (e.g., three years) who report receiving at least two doses of tetanus toxoid vaccine and the denominator is the number of live births in the same reference period. The number of live births serves as a proxy for the number of pregnant women.

Where data on the number of live births are unavailable, evaluators can estimate the total number of live births using census data. Total expected births equal the area's population times the crude birth rate. In settings where the crude birth rate is unknown, WHO recommends estimating the number of pregnant women as 3.5% of the total population (population x 0.035).

STRENGTHS & LIMITATIONS: This indicator allows routine reporting to monitor TT coverage. Mothers who have not received two or more doses can be vaccinated immediately to protect their pregnancies and future children. However, pregnant women may have received two TT doses yet not be fully protected.

Table 8 – WHO-Recommended Tetanus Toxoid Immunization Schedule for Women of Childbearing Age and Pregnant Women without Previous Exposure to TT, Td, or DTP

Dose of TT, Td, or DTP	Given	Level of protection	Duration of Protection
TT 1	At first contact or as early as possible in pregnancy	None	None
TT 2	At least four weeks after TT 1	80%	1-3 years
TT3	At least 6 months after TT 2 or during subsequent pregnancy	95%	At least 5 years
TT 4	At least one year after TT 3 or during subsequent pregnancy	99%	At least 10 years
TT 5	At least one year after TT 4 or during subsequent pregnancy	99%	For all child-bearing years and possibly longer

6 PERCENT OF CHILDREN AGED 12-23 MONTHS FULLY IMMUNIZED BEFORE 12 MONTHS

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This measures the percent of children aged 12-23 months who have received three doses of oral polio vaccine, three doses of DTP, and one dose each of bacille Calmetter-Guérin and measles vaccines before 12 months (the definition of “fully immunized” may change as new and underutilized vaccines are introduced).

Calculation

$$\frac{\text{\# of children age 12-23 months fully vaccinated before the age of 12 months}}{\text{total \# of children age 12-23 months surveyed}} \times 100$$

DISAGGREGATE: None.

PURPOSE: This indicator measures how well a country or region delivers recommended vaccines during children’s first year of life. It also measures public demand and perceived quality of services.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Ideally, data are taken from a child’s vaccination card. If the mother cannot produce a card, she is asked about her child’s vaccinations. The source of data should be noted for each child surveyed.

STRENGTHS & LIMITATIONS: This indicator helps measure progress toward reducing morbidity and mortality due to six common vaccine-preventable diseases. This indicator does not differentiate between a child that has received most but not all vaccinations and a child who has received none at all, and neither does it indicate whether doses were given at proper intervals or ages. Data sources for this indicator are not always reliable. The current definition of “fully immunized” is subject to change within a region and over time.

Table 9 – Monitoring Immunization Programs

This table provides a logic model for common elements of vaccination programs.

Inputs	Vaccines, refrigerators, temperature charts, vaccination cards, needles, syringes, etc.
Process	Training, supervision, service delivery, surveillance
Outputs	Functional Outputs Immunization sessions held, education sessions held, health workers trained in EPI Service outputs Client satisfaction, client services
Outcomes	Increased coverage, reduced drop-out, increased parents' knowledge of when to return
Impact	Reduced disease incidence, lower infant and child mortality

7 PERCENT OF HOUSEHOLDS WITH ACCESS TO AN IMPROVED SOURCE OF DRINKING WATER

LEVEL OF MEASUREMENT: Output.

DEFINITION: This measures the percent of households with access to one of the following types of water supply for drinking: piped water into dwelling or yard; public tap; bore hole/pump; protected well; protected spring; rain water. “Unimproved” water sources include an unprotected dug well or spring, surface water (river, dam, lake, pond, stream, canal, and irrigation channel), water truck, and any other type of mobile supply.

Different definitions of “access” limit the usefulness of this indicator for cross-national comparisons. This indicator is mainly useful for indicating whether the available water source is improved or unimproved. While the household may access the water source, access could still be limited because of the time it may take to get water and/or the water source’s seasonal availability.

Calculation

$$\frac{\text{\# of households with access to an improved source of drinking water}}{\text{total \# of households surveyed}} \times 100$$

DISAGGREGATE: Target area (if necessary).

PURPOSE: Lack of clean water for drinking and sanitation greatly increases disease transmission through contact with feces. This indicator is an approximation of access to safe water and an indirect indicator of water use. The closer a water source is to a family, the more water it tends to use.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Information on the household’s main source of drinking water can be obtained verbally from heads of households or from interviewer observation. Interviewers should be familiar with different types of water supply. If bottled water is mentioned as the main source of drinking water, a second source of water for cooking and hygiene should also be recorded. The water source may differ according to season, and access during a dry season should be recorded. Distinguishing between protected water sources that are “improved” and those that are “unimproved” is a challenge. Protected dug wells are covered and have raised linings or casings and platforms to divert spilled water. Protected springs have boxes to protect the spring from runoff and other contamination. Both of these sources may be considered improved or unimproved, depending upon circumstances.

STRENGTHS & LIMITATIONS: Data to calculate this indicator are easily collected; families and individuals use and drink most of their water at home. Specific, simple definitions for an “improved water source” increase the chances of getting precise, accurate information from interviews. However, water from an improved source may still be unsafe if it is contaminated or used without proper hygiene practices, and this indicator does not address these issues of water quality. Water may be effectively treated even if taken from an unsafe source. Water usage may differ substantially within and outside of the household.

8 TIME SPENT BY HOUSEHOLD MEMBERS TO COLLECT WATER

LEVEL OF MEASUREMENT: Output

DEFINITION: This measures the time household members spent in the last 24 hours collecting water from one of the following safe sources: piped water, public taps, bore hole/pump, protected wells, protected springs, or rain water. Time should be collected in minutes, even if the time is over one hour (e.g., 75 minutes), and should be measured on a daily basis. It is the amount of time spent, rather than the distance, that is of interest — the water source could be reached by foot, car, or bicycle. This indicator should include time spent waiting in line, filling containers, and performing other collection activities — the “time spent” measure should be the sum total of all activities related to water collection.

DISAGGREGATE: None.

PURPOSE: In households without an improved water source at home, the effort required to obtain water can be a significant drain on already strained time and resources. This indicator allows an estimate of this effort and can be used to prioritize where efforts to improve water access should be focused.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Information can be obtained verbally from heads of households and for each household member. Time collecting water needs to be summed across household members to obtain the total time spent collecting water by a household. Typically presented as the average time households spend collecting water at the population level.

STRENGTHS & LIMITATIONS: This indicator also measures economic status. Having respondents answer about their most recent experience lowers the likelihood that respondents will give inaccurate estimates. Data for this indicator are easily collected. However, the average time needed to collect water may vary substantially from year to year or season to season. Also, this indicator does not measure whether the source water is safe to drink.

9 PERCENT OF HOUSEHOLDS USING AN IMPROVED TOILET FACILITY

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: An “improved” toilet facility means a flush/pour-flush toilet connected to a piped sewer system, septic tank, or pit; a ventilated-improved-pit latrine; simple pit latrine with slab that can be cleaned; or a composting toilet. An “unimproved” toilet facility includes flush/pour-flush toilets that empty elsewhere without connection to piped sewage systems, septic tanks, pits, or have unknown drainage; pit latrines without slabs or open pits; bucket latrines (where excreta are manually removed); hanging toilets/latrines; open defecation in field or bush or into plastic bags (flying toilets); and any other type of defecation.

Calculation

$$\frac{\text{\# of households that have working improved toilet facilities within their compounds}}{\text{total \# of surveyed households}} \times 100$$

DISAGGREGATE: None.

PURPOSE: Access to a functioning and improved toilet facility is essential for improving a household’s hygienic situation. This indicator measures access to such facilities.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Household heads or caretakers should be interviewed about the type of toilet facility they use; afterwards interviewers should observe the facility to see if it is accessible.

STRENGTHS & LIMITATIONS: This indicator does not measure whether toilet facilities are used or whether they are hygienic.

10

PERCENT OF HOUSEHOLDS USING SOAP IN LAST 24 HOURS

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This indicator measures the percent of households where soap is used on a regular basis. Use of soap at the most critical times (after defecation and before cooking or eating) for hand washing can decrease the risk of diarrheal disease. Although ash, sand, and mud are mentioned in the literature as local alternatives, neither their acceptability as a cleansing agent nor their actual use on a significant scale has been established. The use of soap for washing hands is commonly promoted through public-private partnerships.

Calculation

$$\frac{\text{\# of households reporting washing hands with soap before cooking/eating and after defecation over the past 24 hours}}{\text{total \# of households surveyed}} \times 100$$

DISAGGREGATE: None.

PURPOSE: Washing hands with soap is essential to controlling diarrheal diseases. This indicator represents actual behavior, not knowledge. Washing hands with soap at two critical times is suggested as a minimum but programs may choose to set higher targets if more frequent hand washing seems achievable.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Alternatively, the interviewer can observe hand-washing facilities and techniques but this would not measure soap use, only the availability of hand-washing supplies. The household respondent (often the caregiver of the youngest child) is asked about their use of soap in the last 24 hours to reduce recall bias. It is important to also ask whether the household has soap.

STRENGTHS & LIMITATIONS: This indicator is easily collected, and observation allows for a reliable assessment of available conditions. However, this indicator does not necessarily measure proper water storage, hand washing techniques, or how often hands are washed on a regular basis.

11 PERCENT OF HOUSEHOLDS STORING DRINKING WATER SAFELY

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: Storing drinking water safely means that the water should not be contaminated by exposure to dust or dirt. Safe containers should be tightly covered and narrow-necked. “Tightly covered” containers have a screw-top lid or a plate-like cover that completely covers the water storage container and fits tightly. “Narrow-necked” means containers have a neck of 3 cm or less in diameter. Additional water should be stored in cisterns or roof tanks.

Calculation

$$\frac{\text{\# households storing drinking water safely}}{\text{total \# of surveyed households storing drinking water}} \times 100$$

DISAGGREGATE: None.

PURPOSE: Water will not remain safe from contaminants unless it is properly stored. Narrow necks and tight lids keep dirt and dust out of water; cisterns and roof tanks are considered safe because they do not allow individual family members to serve themselves directly by introducing a cup, ladle, or other device into the water source.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: The interviewer for the household survey should ask how the household stores its water and then examine the container to ascertain if it is narrow-necked and covered. A household is counted for the numerator if it meets all criteria for proper water storage. Roof tanks and cisterns are not usually observed, but are considered safe because they generally do not allow individuals to serve themselves directly. Only households that store drinking water are included in the denominator.

STRENGTHS & LIMITATIONS: Data for this indicator are simple to collect.

12 PERCENT OF CHILDREN UNDER FIVE YEARS WHO SLEPT UNDER AN INSECTICIDE-TREATED BED NET THE PREVIOUS NIGHT

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: Insecticide-treated bed nets (ITN) have been dipped in an insecticide effective against local malaria-causing mosquitoes.

Calculation

$$\frac{\text{\# of children under five who slept under an ITN the previous night}}{\text{total \# of children under five surveyed}} \times 100$$

DISAGGREGATE: None.

PURPOSE: This indicator measures malaria prevention in a region. The Roll Back Malaria initiative has identified the use of insecticide-treated bed nets as one of the four main interventions to reduce malaria in Africa.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Mosquito prevalence varies seasonally, so when evaluating trends in this indicator, consider the time of year the surveys were conducted to clarify whether estimates reflect levels during the peak or low malarial season. Data on ITNs are usually collected by asking women aged 15-49 in the household possessing bed nets about the use of bed nets by all of their children under five years old. Respondents are then asked whether the bed net under which the child (children) slept has ever been treated with insecticide to repel mosquitoes or bugs. The next question can ask how long ago the bed net was treated.

STRENGTHS & LIMITATIONS: This indicator easily and quickly measures an important area of malaria prevention. The “last night” condition helps to reduce recall bias. However, this indicator assumes that nets were properly used and maintained, and use and need vary depending on the season.

13 ORAL REHYDRATION THERAPY USE RATE

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: The oral rehydration therapy (ORT) rate is the percent of children under five (0-59 months) with diarrhea (three or more loose or watery stools during a 24-hour period) in the last two weeks who were treated with fluid using ORS and/or recommended home fluids (RHF). ORS is a specific packet of dry powder that is mixed with water to make oral rehydration fluids. RHF are a specific group of liquids and/or foods recommended for treatment of diarrhea by a national health program or health professional. The specific liquids and foods approved for RHF vary from country to country.

Calculation

$$\frac{\text{\# of children under five with diarrhea in the last two weeks who were treated with ORS and/or RHF}}{\text{total \# of children under five surveyed who had diarrhea in the last two weeks}} \times 100$$

DISAGGREGATE: None

PURPOSE: The basic principal of home management of diarrhea using ORT is to reduce dehydration by increasing fluid intake, including usage of ORS and/or RHF. Increases in the use of ORT are associated with marked falls in the annual number of deaths attributable to diarrhea in children under five years.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: To ascertain this information, caretakers of children under five years old with an episode of diarrhea in the last two weeks are asked whether the child was treated with ORS and/or RHF. Although measuring ORS and RHF utilization is frequently used to measure ORT use for diarrhea in children, the definition of ORT has changed over time. The definitions of: 1) treatment with ORS; 2) treatment with ORS and/or RHF; 3) treatment increased with fluids; and 4) treatment with increased fluids combined with continuous feeding (same or increased food) for the affected child. Because the definition of this indicator has changed over time, care should be taken to be consistent in the numerator and denominator of this calculation.

STRENGTHS AND LIMITATIONS: The indicator is easy to measure, and the two-week period reduces problems with recall. However, the indicator does not capture timely treatment of diarrhea. It also does not measure the severity of the illness, whether safe water was used to mix ORS, continuous feeding practices, or whether ORT was administered correctly.

Environment Indicators: *Natural Resource Management, Species Preservation, Income-Generation Activities*

The environment indicators in this section focus both on system health (“species abundance and distribution”) and measuring healthy, sustainable interactions between communities and their environments (“area under improved management”). While this section includes environmental outcomes, it also includes indicators that measure inputs, processes, and outputs. Environment indicator topics include habitat status, improved practices/management, natural resource management committees, and enforcement of environment protection laws. The environment indicators best suited for individual PHE or environment programs will depend on program goals and resources.

Environment-related work in PHE programs naturally complements efforts to improve governance by building capacity of local government bodies, and even communities, to manage shared resources in a sustainable manner for current and future revenue generation or livelihood purposes. More than half of the environment indicators in this guidebook are value-added in the governance, livelihoods, and/or underserved populations sectors. Five indicators in this section are value-added for more than one area. This reflects the multi-sectoral approach of environment-related activities in PHE programs.

Table 10 – Environmental Indicators

Process/Outputs	Outcomes
1. Percent of communities in target area that have developed a community-based natural resource management plan	8. Percent of community-based natural resource management plans that are approved by a government authority
2. Number of officers trained in laws and enforcement procedures and posted to a permanent enforcement position	9. Percent of farmers/fishers who adopt improved agricultural/marine practices
3. Hours of enforcement patrols logged	10. Area of habitat under improved management
4. Area of legally protected habitat	11. Area of secondary forest regenerated
5. Number of trees planted	12. Population structure of species
6. Percent of trees planted that survive	13. Species richness
7. Number of educational sessions on improved agricultural/marine practices	14. Species abundance and distribution

1 PERCENT OF COMMUNITIES IN TARGET AREA THAT HAVE DEVELOPED A COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT PLAN

LEVEL OF MEASUREMENT: Output.

DEFINITION: Community-based natural resource management (NRM) plans take place in community settings and involve community members participating in formal discussions about the plan. Community-based NRM plans have elected members for drafting, finalizing, and implementing/enforcing the decisions set forth in the plan.

An NRM plan is a written document, agreed to by an NRM committee, that proposes changes in the management of local natural resources. Examples of a plan include:

- a regional land use plan with details on the permitted yield that can be taken by area and/or volume
- guidelines on permitted harvest levels, stock size, gender and age of species harvested, etc.
- guidelines on seasonal quotas or restrictions in use of natural resources
- a forest management plan with details on the allowable annual number of trees permitted to be cut, the minimum diameter of the trees to be cut, and the maximum number of trees to be harvested per hectare

Calculation

$$\frac{\text{\# of communities in the target area that have a community-based NRM plan}}{\text{total \# of communities in the target area}} \times 100$$

DISAGGREGATE: Target area.

PURPOSE: Community-based management integrates the ecological, social and economic dimensions of land/marine protection management encouraging ownership and responsibility at a local level. Community involvement increases the likelihood of linking local economic development and conservation goals. This indicator measures the coverage of the project in the target area for the development of NRM plans. An implemented NRM plan should ultimately lead to better management and protection of the project's natural area or habitat.

DATA SOURCES: Project records, secondary records (NRM plans).

TIME FRAME: Semi-annually, annually.

DATA COLLECTION CONSIDERATIONS: Communities should be asked about completed plans, plans currently in development, and plans proposed for the future. The plan is not counted toward this indicator until it is considered completed.

STRENGTHS & LIMITATIONS: This indicator is easy to collect with readily-available data. However, a community-based NRM is not easy to conduct and takes time and resources. Development of a plan does not mean it will be implemented or implemented effectively.

2 NUMBER OF OFFICERS TRAINED IN LAWS AND ENFORCEMENT PROCEDURES AND POSTED TO A PERMANENT ENFORCEMENT POSITION

LEVEL OF MEASUREMENT: Process/Output.

DEFINITION: This indicator is defined as the total number of new and in-service officers trained in laws and enforcement procedures and posted within a 12-month period.

An enforcement officer is someone who protects a habitat and its resources by participating in law enforcement activities. The officer could be participating in a community-based enforcement program and need not be affiliated with an official park or police service. Duties may include protecting habitat integrity; preventing illegal logging, fishing, hunting/poaching, wildlife trade or resource extraction; preventing pollution; preventing physical encroachments on protected lands; and fining and prosecuting violators.

“Officially trained” means that the officer has been trained to local standards and, when it is the norm in a region, has the full legal right and capacity to act in the position of a government-recognized enforcement officer. A “target area” is defined as the physical area legally protected where the enforcement officer will work.

The goal of this indicator is to measure whether new officers have been certified and/or trained before they receive their posting or whether permanent officers are trained in enforcement procedures.

DISAGGREGATE: New and in-service officers; target area (if desired).

PURPOSE: Enforcement activities and results measure the capacity to actually protect areas and species and to ensure that community natural resource management plans are respected. This is an indicator of the likelihood of being able to prevent illegal deforestation, hunting, and other prohibited activities by having trained officers posted in the appropriate areas.

DATA SOURCES: Project records.

TIME FRAME: Quarterly.

DATA COLLECTION CONSIDERATIONS: The quality or length of training will vary by area. The definition of “trained” should be specifically defined to meet a local standard. If projects collaborate with local authorities, authorities should be contacted to verify the postings.

STRENGTHS & LIMITATIONS: The number of trained officers may be an indication of improved commitment at a local, regional, or national level to enforce laws regarding the protection of animals and natural resources. However, this indicator does not take into account how many hours per week the officers work, the amount of corruption and violence in the region, and how likely it is that the officers are committed, or even able, to do their job safely. The overall amount of enforcement funding and the amount and quality of available equipment will also determine what enforcement officers can achieve. This indicator neither measures the quality of training nor takes into account the turnover rate (i.e., how many officers are leaving or quitting per year compared to how many officers are retained or newly added).

3 HOURS OF ENFORCEMENT PATROLS LOGGED

LEVEL OF MEASUREMENT: Output.

DEFINITION: Hours of enforcement patrols logged is defined as the total number of cumulative hours that all officers are out in the field participating in enforcement activities in a given period. Enforcement activities while on patrol may include routine monitoring of the target area, specific site inspections for suspected violations, writing up warnings and infractions for confirmed violations, participating in the prosecution and case against violators, and confiscating illegally taken resources. “Logged” means that the officers record their patrols in an official register that they either keep with them or is held at the station.

Enforcement patrols can be undertaken by boat, foot, or vehicle. The amount of enforcement needed depends on the number/type of entry points into the protected area and the level of threat to the area. Thus, it may not be possible to compare enforcement between areas by using only the hours of patrols.

DISAGGREGATE: Target area (if desired).

PURPOSE: The total number of patrol hours spent in the field will be directly related to the proportion of all occurring violations that are actually discovered. Effective enforcement is essential to allow areas to reach their potential in protecting and preserving resources and species. Hours logged indicates a commitment on the part of the enforcement officers and/or their commanding bodies to enforce rules and regulations.

DATA SOURCES: Secondary records (logbooks) and/or project records.

TIME FRAME: Monthly.

DATA COLLECTION CONSIDERATIONS: The logbooks should have sections where officers can record the date, hours spent on patrol, exactly when the patrol hours occurred (e.g., daytime or evening), the exact portion of the target area they were working in, total distance covered (using GPS data when possible) and the exact nature of their job for that day (i.e., if they were primarily involved in an anti-logging patrol, a sea-patrol, or a general patrol for any type of violation). These log books or forms should be standardized for all officers so that the same data points are collected and can be easily accumulated at the end of each month.

STRENGTHS & LIMITATIONS: Data are easy to collect, assuming that there is a logbook for enforcement officers to record their activities. This is a reflection of the actual effort in the field. However, the recorded time spent on patrol does not necessarily reflect the quality of the patrol activity since quality may depend on many things such as the motivation and resources of the officers. The terrain of an area may limit enforcement activities or the number of hours spent on patrol: if the area is mountainous or has harsh conditions, then less enforcement may occur.

4 AREA OF LEGALLY PROTECTED HABITAT

LEVEL OF MEASUREMENT: Output.

DEFINITION: “Legally protected” means that the area is being shielded from damage or destruction by to legal authority. Many different levels of legal protection exist, allowing for a diverse range of acceptable or prohibited activities. Examples of protected areas include marine or forest reserves, no-take zones, sanctuaries, parks, locally managed resource protected areas, strictly protected areas/nature reserves/wilderness areas, and national or state parks, among others.

An “area” is defined as a geographical region with defined boundaries based on legal status. For land areas, this is measured in hectares. One hectare is 10,000 square meters. (Acres are more commonly used in the United States and Canada, 1 hectare=2.471 acres.) For marine areas: square nautical miles or square kilometers are used to measure area. (Nautical square miles are more commonly used in the United States and Canada, 1 square kilometer = 0.292 nautical square miles.)

Habitat is the natural, physical home or range of wildlife species. Protected areas are difficult to develop in isolation and should not stand alone. A protected area will rarely succeed unless it is embedded in, or is so large that it makes up, an integrated ecosystem management strategy.

DISAGGREGATE: By specific marine/forest reserve area.

PURPOSE: Habitat fragmentation occurs when external disturbances cause large intact habitats to be divided into smaller units, often resulting in adverse ecological effects. Protected areas are a form of spatial environmental management and are needed to provide areas where fish/wildlife can spawn/breed and grow to their adult size and to maintain ecosystem goods and services such as clean drinking water. They can help accelerate the recovery of already depleted populations, as well as protect healthy, intact populations of species.

Protected areas may lead to direct human benefits, such as increased yield or size of fish, wildlife, or other extracted products. Overall management generally improves due to the shift in focus from single species to an ecosystem. Protected areas also provide a “control” against which to compare areas that are impacted to a greater extent by human activities and this information can be used to further inform and improve resource management.

DATA SOURCES: Secondary records (laws, natural resource management plans).

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Examination of legal documents may be sensitive in some countries. However, as this is an indicator of legally protected habitat, these data should be available from policy makers, ministries, or other government sources. Other forms of legal documents such as contracts with local communities or local authority agreements are also sources of these data. Further sources may include formal agreements between local, regional or national authorities with nongovernmental organizations or foundations.

STRENGTHS & LIMITATIONS: Measurement of this indicator should be relatively easy and straightforward to obtain since the indicator is unambiguous and has been legally defined. However, progress on this indicator may be slow: changing laws and policies may occur over the course of several years. Also, protected areas only fulfill their purpose when they are actually protected, which may require significant enforcement efforts. Additionally, this indicator does not reflect the location of the protected area and whether it protects key species or biodiversity hot spots.

5 NUMBER OF TREES PLANTED

LEVEL OF MEASUREMENT: Process/Output.

DEFINITION: This indicator is a number count of the trees (plants, seeds, or saplings) planted by species. Native tree species are likely to be more tolerant of local weather, pest and soil conditions, and will be of greater benefit to wildlife than non-native trees. Non-native trees may invade other areas, crowd native vegetation, and adversely impact ecosystems. The type of tree planted and in what area depends on the specific geographic location and project and community goals. The targeted areas selected by the project for replanting/regeneration should be determined in advance and remain fixed throughout the life of the project.

DISAGGREGATE: By tree species; geographic area.

PURPOSE: Monitoring the number and species of trees planted measures the project's success toward longer-term results, such as increasing the area of secondary forest regenerated, and may indicate a reduction in encroachments into primary, virgin forest. Secondary forests can provide many of the products that people traditionally obtained from primary forests, while providing some of the environmental benefits that primary forests offer. Trees provide other benefits to humans such as shade and energy conservation, reduced soil erosion, and wind and noise buffering, while also providing wildlife habitat. Trees that produce fruits or nuts can provide food for many species of wildlife as well as for humans. In addition, tree planting can be a community education and engagement activity that builds community awareness and appreciation for their forest resources. Lastly, increasing the natural diversity of trees will provide habitat for additional wildlife species and makes it less likely that a single pest or disease will wipe out all the trees.

DATA SOURCES: Project records, transect surveys.

TIME FRAME: Quarterly, annually.

DATA COLLECTION CONSIDERATIONS: The project should keep detailed logbooks on the numbers and species of seedlings or trees planted, the specific locations where plantings occurred, the dates of plantings, and data on climate and pest outbreaks. In addition, data should also be kept on the number of tree nurseries or woodlots in the target area and seedlings or tree survival rates after one or two years, as assessed by transect surveys.

STRENGTHS & LIMITATIONS: The number of trees planted should be readily available through project records. However, the number of trees planted is not an indication of the tree survival rate, tree diversity, or suitability for local wildlife and conditions.

6 PERCENT OF TREES PLANTED THAT SURVIVE

LEVEL OF MEASUREMENT: Output.

DEFINITION: The survival rate should correspond to the same geographic area as the place where the trees were planted. The defined target area is the area that is considered in need of regeneration and is predetermined by the project. “Surviving” is defined as being alive at the end of a predetermined period of time. The exact period of time will vary by species.

Calculation

$$\frac{\text{\# of plants, seeds, or saplings surviving at the end of a predetermined period of time in a defined target area}}{\text{\# of plants, seeds, or saplings planted in a defined target area}} \times 100$$

DISAGGREGATE: Tree species; target area.

PURPOSE: Monitoring the number of trees surviving measures the project’s potential to achieve the ultimate goal of increasing the area of secondary forest regenerated. Secondary forests can provide many of the products that people traditionally obtained from primary forests, while providing some of the environmental benefits that primary forests offer. Trees provide other benefits to humans such as shade and energy conservation, reduced soil erosion, wind and noise buffering, while also providing wildlife habitat. Trees that produce fruits or nuts can provide food for many species of wildlife as well as for humans.

This indicator is an intermediate step between planting and actual forest regeneration. This indicator is important because actual forest regeneration may take many years. During this time, this indicator can assess if plantings are effective (i.e., is the project planting suitable species, are local conditions conducive to tree survival). For example, if a project is planting a tree species that does not do well in the target location then the project will become aware of this when measuring tree survival, rather than waiting the many years needed to assess actual forest regeneration.

DATA SOURCES: Transect surveys, project records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: As described in the previous indicator, the project should be keeping detailed logbooks on the numbers and species of seedlings or trees planted, the specific locations where planting was done, the dates of planting, as well as data on climate, pest outbreaks, illegal

logging, and fires. When choosing which types of trees to plant, information on the rate of growth and time needed to reach a tree's full height and growth will determine how often this indicator should be assessed.

Data collection methods will depend on the size of the target area. For small areas, transects done on foot may be possible to assess the number of surviving trees. For large areas, it may be necessary to do field surveys by vehicle over larger areas or to measure survival only in randomly selected plots and then extrapolate results to the total target area. Plot sampling is where a specific plot or quadrant is identified and studied.

STRENGTHS & LIMITATIONS: If the project has kept careful records and is working in a small area, this indicator should be simple and inexpensive to collect. However, the tree survival rate doesn't account for tree diversity or suitability for local wildlife. The number of surviving trees may be affected by factors outside the control of the project, including weather conditions, disease outbreaks, insect or animal pests, illegal logging, fires, human uses of the forest, etc. The number of surviving trees may also be affected by things under the project's control such as the suitability of the chosen species to the local climate and conditions, the time of year when planting was done, and the quality and storage of the initial plants, seeds, or seedlings.

7 NUMBER OF EDUCATIONAL SESSIONS ON IMPROVED AGRICULTURAL/MARINE PRACTICES

LEVEL OF MEASUREMENT: Process/Output.

DEFINITION: This measures the total number of times the project's community educator teaches or works with farmers or fishers on improved practices. Each formal or informal visit with the farmers or fishers should be counted using predetermined criteria, i.e., length of time spent, discussion of a specific message or method, etc. An improved agricultural/marine practice is any technique that provides additional human health and environmental benefits or does less harm to human health and the environment compared to previously used techniques.

Examples of improved practices include: use of green manure as a fertilizer; reductions in pesticide use; implementation of agro-forestry systems; use of sustainable extractive reserves; use of less destructive aquaculture techniques, a switch to less harmful fishing equipment; or a ban on intrusive boats, etc. The type of practice introduced by the project generally depends on the geographical setting and pre-existing practices in that setting. Introducing the improved agricultural or marine practices in the target area means there is an organized effort to train and teach local people about the new methods and how they can be adopted. The specific practices measured in this indicator should be determined by the project in advance.

DISAGGREGATE: Type of improved agricultural or marine practice; geographic area (if desired).

PURPOSE: Improved agricultural/marine practices are especially important where large areas are under human use and cannot remain in, or return to, a natural state. Such practices can increase the yield of products, generate additional income, protect wildlife, and prevent soil erosion and water pollution.

Human health can also benefit as the result of increased crop yields, more food, better nutrition, increased income and money available to spend on family well-being, and reduced chemical exposures among farm families/workers.

DATA SOURCES: Project records.

TIME FRAME: Monthly or quarterly.

DATA COLLECTION CONSIDERATIONS: The project's community educator should have a logbook where this information is recorded and reported monthly to the project manager. For each visit, the log book should include the date, location, type of practice introduced or message relayed, length of time of the visit, farmer(s)/fisher(s) targeted (names, if possible), whether permission from the farm owner has been granted, and type of agricultural/marine practice currently in use. A form should be

developed that is standardized and used by all project community educators for easy comparison and assembling of information across the project. Other items of information can be added to the standardized form as fits the specific needs of the project.

STRENGTHS & LIMITATIONS: This indicator allows for regular monitoring of implementation of the project's efforts to educate farmers/fishers and to introduce improved agricultural/marine practices into an area where destructive practices may currently be in use. In cases where the natural resource management plan of a community includes implementing improved agricultural/marine practices, this indicator is also useful in monitoring progress of efforts toward improved management. However, this indicator does not assess adoption or practice of new knowledge and skills. Care must be taken not to assume that a new practice is necessarily "improved." Best practices for agricultural and marine production may vary greatly by geography and economic setting.

8 PERCENT OF COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT PLANS THAT ARE APPROVED BY A GOVERNMENT AUTHORITY

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: NRM is the management of all activities that use, develop, and/or conserve air, water, land, plants, animals, and ecosystems. NRM committees are organized groups of people who meet regularly and attempt to practice natural resource management. A “government authority” is a person who works for the government and has the power to make legal decisions. “Approved” means the plan has been officially adopted as having the effect of law — it is enforceable.

Calculation

$$\frac{\text{\# of government-approved community-based NRM plans}}{\text{\# of community-based NRM plans finished and submitted to a government authority for approval}} \times 100$$

DISAGGREGATE: None.

PURPOSE: Community control at the local level can result in more sustainable environmental management where locals are likely to benefit from their choice of land or natural resource use. Often natural resources are owned and/or controlled by the state or commercial interests, even when local or indigenous people have occupied a territory for many years or generations. When local communities have the legal right to manage local resources, they begin to value resources leading to ongoing conservation.

DATA SOURCES: Secondary records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Examining secondary records such as legal documents may be sensitive in some countries. The project should work with the locally-based NRM committee and government authorities to receive documentation for this indicator.

STRENGTHS & LIMITATIONS: Measurements should be relatively easy and straight-forward to obtain since the indicator is unambiguous and has been legally defined. However, changing laws and policies can be a slow process that may occur over the course of several years, requiring ongoing monitoring. Although a community-based NRM plan may not have been approved by a government authority, it may still be in the process of being implemented by the community. This indicator does not reflect whether there is improved management on a local level.

9 PERCENT OF FARMERS/FISHERS WHO ADOPT IMPROVED AGRICULTURAL/MARINE PRACTICES

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This indicator measures actual use of improved agricultural or marine practices that the project has introduced. “Adopt” means practicing or using the improved practices. A “farmer” refers to any person who works on or owns a farm. A “fisher” refers to any person who catches fish or other marine species for human consumption.

Calculation

$$\frac{\text{total \# of farmers/fishers using improved practices}}{\text{total \# of farmers/fishers targeted for improved practice adoption}} \times 100$$

DISAGGREGATE: By type of improved agricultural/marine practice; if desired, by target area .

PURPOSE: Monitoring only the educational sessions held or the practices introduced is not an indication of whether the practice has been adopted. This indicator will assist the project in better measuring the outcome of its efforts to introduce improved agricultural/marine practices.

DATA SOURCES: Population-based survey of farmers/fishers; project records; direct observation for project records.

TIME FRAME: Annually or corresponding with agricultural or marine harvesting cycles. Every two to five years for surveys.

DATA COLLECTION CONSIDERATIONS: Data collection strategies and the survey will need to be altered for specific types of farming/fishing such as fruit, vegetable, grain, meat, dairy, fish, seafood, or other. To reduce recall bias, data collection may need to occur several times a year to coincide with cropping/fishing cycles.

Surveys should include such information as date, position of the person providing the information (e.g., farm owner, farm worker, fisher, etc), types and extent of use of previous practices, types and extent of use of current practices, types and extent of use of practices being considered for the future, type of farming/fishing and size of the operation (e.g., total area of farm or area fished or the number of farm/fishing employees). Questions for this section should be adapted for the specific type of farming or fishing, and whether the improved practice introduced by the project has been used just once, consistently, exclusively, or over the long-term (with specific time frame specified).

Determining the total number of farmers or fishers living or working in the defined target area may be straight-forward for small, well-known areas but may be considerably more difficult for large, dispersed target areas. Use of an improved practice should be monitored over time (e.g., yearly) to see if farmers/fishers are simply trying out improved practices or if they are more permanently switching to the improved practices over time.

STRENGTHS & LIMITATIONS: This indicator measures the percentage of farmers/fishers who adopt improved practices, yet the decision of what agricultural practices to use for a large area may be controlled by just one farmer if he owns the land being worked. In this case, measuring the farms that adopt improved agricultural practices may be more useful. Similarly, a fisher working for a large commercial establishment might not be able to make independent decisions on resource practices.

10 AREA OF HABITAT UNDER IMPROVED MANAGEMENT

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: “Improved management” means that the community is implementing a community-based natural resource management plan for the area. To qualify for this indicator, community plans can be at any stage of completion but should currently be underway. This could mean that natural resources were not previously managed, or that existing management has been improved or expanded. “Habitat” is defined as the geographical region with defined boundaries that is targeted for improved management. Boundaries may be based on legal, locally recognized, cultural, political, or geographic factors.

The area measured is the total area covered (e.g., cumulative hectare total from year to year) by the implemented plan per community, municipality or key biologically important ecosystem or region, whether marine or forest habitat. For land habitats, area should be measured in hectares. One hectare is 10,000 square meters. (Acres are more commonly used in the United States and Canada; 1 hectare=2.471 acres.) For marine habitats, area should be measured in square nautical miles or square kilometers (nautical miles are more commonly used in the United States and Canada; 1 square kilometer = 0.292 nautical square miles).

Examples of activities in improved management plans include forest regeneration from tree planting; coral reef regeneration and protection; selective logging plans; maintaining habitat in a way that prevents soil erosion, preserves water resources, protects against natural hazards or maintains other key ecosystem functions; leaving designated areas for conservation; utilization of forest tree genetic resources and seed production; leaving designated areas for wildlife species; and protection of key marine breeding waters and beaches.

DISAGGREGATE: Geographic area covered by NRM plan (if desired).

PURPOSE: Improved forest or marine habitat management leads to a healthier environment and positively affects the species that depend on the environment. Areas must be managed to balance both immediate human needs and long-term environmental health. Increasing the area of improved management or establishing new areas under improved management is an indication of project outcome-level success.

DATA SOURCES: Secondary records (NRM plan), transect survey, key informant interviews, mapping.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Clearly defining “improved management” based on the criteria of the specific project and its interventions is integral to the meaningfulness of this indicator. The habitat measured should be defined in advance as the target area of the project and the change in land or marine area under improved management is tracked over time.

In some cases the total area of the target region may already be known (e.g., for a national park). In other cases, the area of the target region may need to be measured via walk-through, by plane or boat to measure the distances.

The existence of a management plan does not count toward this indicator. Although the existence of a plan could be a first step toward improved management, it does not indicate that the plan is being implemented. Implementation can be measured by the regular monitoring of habitat and species conditions, or enforcement mechanisms put in place to implement rules and regulations, for example.

STRENGTHS & LIMITATIONS: Demonstrating improved habitat management can indicate implementation of community-based approaches to development of natural resource management plans. However, determining “improved management” can be subjective. Natural resource management plans may vary greatly in quality, implementation, supervision, and enforcement. Moreover, measuring the physical area of a region under community management may be time consuming and difficult.

11 AREA OF SECONDARY FOREST REGENERATED

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This involves the total area (in hectares) of regenerated, secondary forest. Secondary forest is forest that has previously been logged or destroyed. Regeneration is defined as any re-growth or renewal of forests or stands of trees by natural (being left alone) or artificial (via, seed, sapling, or tree planting) means after a temporary condition reduced the primary forest to less than 10% canopy cover. An area of forest regeneration is defined as the geographic region with defined boundaries where trees were planted or where the area was left undisturbed for regeneration purposes. Boundaries may be based on legal, locally recognized, cultural, or geographic factors (e.g., a mountain range or a river).

DISAGGREGATE: Type of forest (if desired), target area.

PURPOSE: Secondary forest provides refuge to a diversity of species by providing food and refuge. Conservation of secondary forests may be an effective investment in future wildlife diversity since species recover relatively rapidly in secondary forests. Land-use practices based on secondary forests play a critical role in sustainable management and biodiversity conservation. Humans may also benefit from less soil erosion, improved watershed protection, less pollution from run-off, and increased income opportunities related to forest tree products such as fruits or latex.

DATA SOURCES: Transect survey, plot sampling, mapping, project records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: When measuring what percent of the total target region was regenerated, it may be necessary to also do walk-throughs, drive the perimeters, or fly over the area to measure the distances. Physical surveys should use repeated transects with sample areas chosen randomly if all areas will not be measured. Plot sampling, where a specific plot or quadrant is identified and studied, can also be completed.

STRENGTHS & LIMITATIONS: Some measurements, such as the number of trees replanted and the total amount of land replanted should be readily available. However, this indicator does not measure the usefulness/appropriateness of the regenerated forest. It may not be a productive forest and it may not support much biodiversity if the right mix of species is not planted. External factors such as climate conditions can affect this indicator.

12 POPULATION STRUCTURE OF SPECIES

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: Species monitoring should include assessments of species' population structure (e.g., breeding, mortality, or age-structure), taking into account spatial and temporal changes. The most appropriate indicators for monitoring species' population structure will vary depending on the threats to the local species of interest and the life-stage the threat is most likely to impact. When baseline knowledge is sufficient and the main local threats are fully known, the most effective monitoring should focus on the life-stage most affected by the threat. A combination of short- and long-term (e.g., nest monitoring over time, change in the proportion of occupied territories) indicators are needed.

Population structure measures will vary depending on the species. Specific measures may include things such as den or nest occupancy rates during the breeding season; territory occupancy and re-occupancy rates; nesting status; number of eggs in nest, average number of offspring produced per territory size in hectares; fledgling or cub survival; sex-ratios of offspring; ratio of pre-adults to adults; and age-specific survival, number of adults in population, etc. All of these would need to be measured repeatedly over time.

DISAGGREGATE: Type of species; target area (if desired).

PURPOSE: Changes in wildlife health may serve as early warnings for factors that can also affect human health. Reproductive health is especially sensitive to threats (e.g., pollutants, lack of sufficient food or water, changes in predator dynamics, etc) and thus measuring reproductive health of species can serve as an early warning of potential problems. Species that are successfully breeding and maintaining their numbers are an ecological indicator of ecosystem health. The number of breeding species is generally related to the available area of land. Thus, these indicators serve as measurable surrogates for the health of the environment.

Population structure and reproductive health/behavior may be susceptible to changes in a particular environmental stressor or reductions in a key resource. Species monitoring can detect ecosystem disturbance before it is too severe. If species are able to grow to maturity and to increase in overall numbers (richness) and abundance then this may lead to increased reproductive potential.

DATA SOURCES: Various combinations of data may be used, including:

- transect surveys
- existing species data
- qualitative interviews with community
- catch and release (e.g., to measure offspring sex ratios)

- radio/satellite-tracking of species (e.g., to identify where dens or nests are)
- observation (nests, dens, other breeding sites, stationary viewing towers)

TIME FRAME: Every two or three years.

DATA COLLECTION CONSIDERATIONS: Occupancy and nesting/breeding status may be measured by visiting and looking into nests, dens, or other known breeding sites each year. Trained observers would record signs of breeding (e.g., nest building) or signs of reproductive activity. Population-wide marking or telemetry may also be used (e.g., affixing transmitting collars to selected species), however this is expensive and is usually only done for large, charismatic and endangered species. Great care must be taken to avoid disturbing species, to avoid altering their normal behavior or driving them away from a particular location.

New methods may need to be developed, especially for species that have not previously been monitored. It may be necessary to monitor a species for at least two years to determine whether changes are related to human activities.

STRENGTHS & LIMITATIONS: Data collection for these indicators has the potential to be very expensive and impractical. It may be possible to use existing data if some organizations are already tracking the health of key endangered wildlife. Species monitoring may be difficult, costly, time-intensive, and requires expertise. Detectable changes in some indicators (e.g., body size) may lag far behind the threat, such as habitat degradation. There is the risk that the indicator may detect threats too late, e.g., when habitat has become too degraded to support viable populations.

13 SPECIES RICHNESS

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This indicator measures the total number of species found during surveys in a defined area. The species chosen for measurement in this indicator will be project- and site-specific.

Species richness is the single most important component of species diversity. Despite the conclusions of many ecologists that species richness by itself is inadequate as a measure of species diversity, many programs use species richness as the only measure of species diversity. Species monitoring should include data collection on the total number of selected species in a defined target area, taking into account temporal changes.

Calculation

$$\frac{\text{\# of different species identified in a target area}}{\text{total target area}} \times 100$$

DISAGGREGATE: Type of species.

PURPOSE: Changes in the numbers of species may serve as early warnings for factors that can also affect human health. Species that are successfully maintaining their numbers are an ecological indicator of ecosystem health. Land-use change, climate change, and human activities such as fishing or hunting may affect the number of species in a region. Habitat conversion or fragmentation may lead to declines in the total number of species in a region or in certain species in particular.

DATA SOURCES: Transect survey.

TIME FRAME: Every two or three years.

DATA COLLECTION CONSIDERATIONS: The best representative umbrella species are those that have the largest area requirements and the most diverse habitat requirements. These are species that may serve to protect many others with smaller ranges. A selection of species with different habitat requirements should be chosen for monitoring including seed dispersers, seed predators, food chain predators, and pollinators that affect local ecosystem structure, productivity, and resilience. It is important not to choose species for monitoring that are relatively scarce and have large geographic ranges because environmental changes affecting one habitat type or location are less likely to influence the total number of these species.

STRENGTHS & LIMITATIONS: Species richness is often a good surrogate for other measures of biodiversity that are more difficult to measure directly. Species identification is usually straightforward, except in some less-studied regions where baseline knowledge is inadequate. Species richness is related to not only the health of wildlife and the ecosystem but also to income-generation opportunities such as ecotourism.

However, accurate estimation of total numbers of species may be difficult, costly, time-intensive, and require expertise. Few standard data may initially be available for baseline comparisons. Methodologies for species monitoring may need to be newly developed for some species. Measuring species richness requires surveys of large sample sizes in order to achieve valid results. Large-scale species monitoring is usually expensive and difficult to implement and maintain. However, monitoring fewer, selected species usually costs less and is easier to implement and maintain.

14 SPECIES ABUNDANCE AND DISTRIBUTION

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: Species abundance is a reflection of the total number of an individual species in a defined geographic area. Species abundance is the average number of a specific species found in a given area (e.g., per hectare, square kilometer, square mile, etc.); this is an indication of how common a given species is. The distribution of an individual species is defined as the geographic or spatial area within which that species can be found. Within any area, the spatial distribution of a particular species may be clustered in one location or may be more evenly distributed throughout the area.

Species' abundance and distribution are key components of species diversity. When the pattern of diversity in protected areas or target areas is described only by the total number of different species (richness), the relative population size and geographic range can be missed (i.e., whether species are relatively rare or common). Therefore, a more comprehensive species monitoring effort should include data collection on the number of selected species in a defined target area as well as mapping of the species' geographic distribution, taking into account temporal changes such as seasonal or breeding patterns. Selection of the most appropriate species for monitoring abundance and distribution will vary depending on the species populations and local threats.

Calculation

$$\frac{\text{\# of individuals of a specific species identified in a survey of the target area}}{\text{total target area surveyed}} \times 100$$

DISAGGREGATE: Type of species, type of targeted area.

PURPOSE: Preserving species diversity is critical to ecosystem health and function including energy fixation, chemical cycling, soil maintenance, ground water purification and access to clean drinking water, protection against flooding, and maintenance of healthy populations of pollinators. Monitoring species abundance and locations can provide early warning of changes in conditions that may negatively impact biodiversity overall and may pinpoint critical areas and species to focus on.

Large wildlife species are often the most affected by human activities because they have large habitat and nutritional requirements, are seldom found in high densities, and have relatively low reproductive rates. The goal is to maintain or increase species abundance of prominent groups of species within natural variation. Collecting data on trends in abundance may help guide project management decisions.

DATA SOURCES: Transect survey, mapping, secondary records (existing species data).

TIME FRAME: Every two or three years.

DATA COLLECTION CONSIDERATIONS: This indicator may be easiest to measure in national parks or other defined areas, or in confined or small areas. Exact methodology will vary greatly depending on the species that are being surveyed and the terrain. Ideally, samples should be collected using a variety of methods and should span a diversity of habitats, species, and seasons. Great care must be taken to avoid disturbing species, to avoid altering their normal behavior and activities or driving them away from a particular location.

New methods may need to be developed, especially for species that have not previously been monitored. Monitoring of species over at least two years is thought necessary to determine whether change in abundance is related to human activities. A decrease in abundance or reduction in distribution observed along with a decrease in the average body size may indicate that the species is being over-harvested.

STRENGTHS & LIMITATIONS: Identification of species is usually straightforward, except in some less-studied regions where baseline knowledge is inadequate. Species abundance and distribution is related to not only the health of wildlife and the ecosystem but also to income-generation opportunities, such as tourism. However, accurate estimation of species abundance and distribution may be difficult, costly, and time-intensive, and it requires expertise. Detectable changes (e.g., changes in distribution) may lag far behind the threat, such as habitat degradation. There is the risk that the indicator may allow detection of threats only once it is too late, e.g., a former habitat has become too degraded to support viable populations.

Integration Indicators: *Partnerships and Communication*

Recent assessments of integrated PHE programs in the Philippines have found that integrated programs have several advantages over stand-alone population, child health, or environment programs. The assessments found that integrated programs were cost-effective compared to the cost of single-sector population, child health and safety, or environment programs. Integrated programs also recruited a greater number of men to family planning efforts and a greater number of women and adolescents to environment/conservation efforts. Integrated programs also improved the perceived value of family planning efforts by packaging them with health interventions.

One of the main long-term goals of integrated PHE programs is to ensure local ownership and sustainability. Therefore, the outcome indicator “number of enabling local ordinances/policies/strategies/doctrines supporting PHE” is included in this section. Short-term outcome indicators in this section measure local PHE awareness (“number of policy-makers, media, and scholars knowledgeable about or aware of a specific PHE issue”), or the diversification of PHE efforts.

Process indicators in this section measure linkages between materials (“number of linked messages/materials created”) and partnerships that increase integration (“number of new PHE partnerships created that make linkages among organizations or institutions from different sectors”). Output indicators in this section measure PHE promotion/education efforts (“number and frequency of PHE educational sessions provided in the target community”).

While any of the indicators in this section may be valuable for the M&E of integrated programs, programs that have a focused nature or that face limited budgets may concentrate on measuring a few indicators that best fit their needs.

Table 11 – Integration Indicators

Process/Outputs <i>Program-Based</i>	Outcomes/Impacts <i>Population-Based</i>
<ol style="list-style-type: none">1. Number of linked messages/materials created2. Instances of population, health, or environment organizations addressing non-traditional audiences3. Number and frequency of PHE educational sessions provided in the target community4. Number of new PHE partnerships created that make linkages among organizations or institutions from different sectors5. Instances of organizations facilitating access to services outside of their traditional sectors	<ol style="list-style-type: none">6. Number of policy-makers, media, and scholars knowledgeable about or aware of a specific PHE issue7. Percent of households knowledgeable about or aware of a specific PHE issue8. Percent of communities in target/project area receiving all three PHE elements9. Number of enabling local ordinances/policies supporting PHE10. Number of placements of linked PHE messages in print and electronic media by independent sources

1 NUMBER OF LINKED MESSAGES/MATERIALS CREATED

LEVEL OF MEASUREMENT: Process.

DEFINITION: Each new communication material, such as an advertisement, video, or educational book, counts as a “created” message. Materials that demonstrate and educate about the linkages between population, health, and environment are considered linked messages.

DISAGGREGATE: None.

PURPOSE: PHE programs often create messages to communicate the linkages between population–health–environment. This indicator is meant to capture the creation of those messages that are cross-sectoral and are meant to communicate the interdependence of human health and the natural environment.

DATA SOURCES: Project records.

TIME FRAME: Quarterly.

DATA COLLECTION CONSIDERATIONS: Determining whether the message is linked could be subjective. The central criteria should be that the message examines a linkage between better human health and environmental quality.

STRENGTHS & LIMITATIONS: The creation of linked messages is simple and straightforward to collect. However, this indicator does not give information about whether the linked messages were adopted, disseminated, or where they appeared. The indicator does not show whether the messages were clear and of high quality; or whether they reached the target audiences.

2 INSTANCES OF POPULATION, HEALTH, OR ENVIRONMENT ORGANIZATIONS ADDRESSING NON-TRADITIONAL AUDIENCES

LEVEL OF MEASUREMENT: Process.

DEFINITION: This includes meetings, publications, coalitions, conferences, brochures, etc. Instances should be listed and described according to which PHE sector addressed a different sector or sectors, and on what topics (i.e., sector-specific or integration). Non-traditional audience means an audience that is in another sector from the one in which the addressee typically works.

DISAGGREGATE: None.

PURPOSE: Measuring this indicator will capture the instances where sectors attempt to communicate outside of their traditional audiences. The cross-sectoral education effort is important to building links between health and environment practitioners.

DATA SOURCES: Project records, secondary records.

TIME FRAME: Semi-annually, annually.

DATA COLLECTION CONSIDERATIONS: Using clearly defined terms in advance can reduce bias in collecting this indicator. When those addressing the audience work in a multi-sectoral setting or when the audience is multi-sectoral, this indicator may not give significant information. Its goal is to collect information about audiences being addressed by organizations that have not traditionally worked in a multi-sectoral setting.

STRENGTHS & LIMITATIONS: This is only a measure of the number of instances that the program or project addresses non-traditional audiences. This indicator does not give information on the topics covered. It is easy to collect as long as project records have a systematic form of recording the instances in which the program or project is involved.

3 NUMBER AND FREQUENCY OF PHE EDUCATIONAL SESSIONS PROVIDED IN THE TARGET COMMUNITY

LEVEL OF MEASUREMENT: Output.

DEFINITION: This is a number count of the educational sessions provided by a project on specific PHE issues that the project chooses in advance. Educational sessions counted here should be on topics related to integration of population, health, and environment rather than educational sessions provided on specific and single-sector topics. These sessions could occur in any context such as presentations to local officials, a community theater presentation, or a more traditional setting such as a group that regularly meets or as part of a community educator's typical work schedule. The critical part of this measurement is that the session is on PHE or linkages, as this indicator does not measure single-sector presentations or educational sessions. The project should define in advance which PHE issues will be addressed in the community and measure educational sessions on the pre-determined topics central to the project's goals.

DISAGGREGATE: Target area (if desired).

PURPOSE: This captures the extent to which the project is educating the target population on the links between humans and the environment. While measuring knowledge or behavior provides outcome information, measuring the number of sessions provided measures the progress made by the project in educating the community.

DATA SOURCES: Project records.

TIME FRAME: Monthly, quarterly.

DATA COLLECTION CONSIDERATIONS: Educational sessions counted in this indicator may differ in methodology. Sessions may include community visits carried out, outreach home visits made, educational talks held, educational or communication programs with integrated approaches, video presentations, etc.

STRENGTHS & LIMITATIONS: This indicator is easy to collect with good project record-keeping; however it does not give an indication of whether the target audience received the message or of their understanding and acceptance of the linked message.

4 NUMBER OF NEW PHE PARTNERSHIPS CREATED THAT MAKE LINKAGES AMONG ORGANIZATIONS OR INSTITUTIONS FROM DIFFERENT SECTORS

LEVEL OF MEASUREMENT: Process.

DEFINITION: “New partnerships” are groups of organizations, either public or private, that have banded together to advance PHE policies or practices. The partnership is usually formed around the implementation of joint activities related to integration either through service provision in a community of environment and health related needs or through expanding knowledge of the links between population, health, and the environment. “Different sectors” means that at least two organizations represented in the partnership are from different technical sectors (population, health, or environment). This instance should be counted toward the formation of the partnership rather than individual instances of collaboration. Therefore, this indicator is only counted once for each partnership. The terms of the partnership should be defined carefully before this indicator can be useful. A partnership is a formal arrangement either between organizations, whether governmental or nongovernmental, but should include a charter, mission, memorandum of understanding, and clear guidelines as to how the partners will work together to achieve the goals of the partnership.

DISAGGREGATE: None.

PURPOSE: Creating new partnerships is what drives new and innovative linkages and programs. There is usually a long time investment in creating the terms and conditions of the partnership. A formal partnership is generally necessary for the implementation of integrated activities except in cases where the organization is formed with an integrated mission. This indicator is meant to capture those partnerships between organizations from different and singular technical sectors that are formed with the purpose of discussing or implementing PHE.

DATA SOURCES: Secondary records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Care should be taken in deciding whether a group of organizations has reached the level of creating a partnership. This measure should only count toward formal partnerships that have written charters and missions. There are many organizations that may collaborate on certain issues or topics but may not have formed a formal partnership.

STRENGTHS & LIMITATIONS: This does not measure the level of success of the partnership or how long the partnership lasts. It does give an easy measurement of whether new and formal partnerships are made among varying sectors and for the purpose of integrated work.

5 INSTANCES OF ORGANIZATIONS FACILITATING ACCESS TO SERVICES OUTSIDE OF THEIR TRADITIONAL SECTORS

LEVEL OF MEASUREMENT: Output.

DEFINITION: This indicator is targeting PHE project implementation models where an organization that traditionally works in one sector (i.e., population, health, or environment) is either working with an organization of a different sector or directly implementing services traditionally provided by a different sector. When one organization facilitates access to a service outside of its traditional sector, it is accepting or promoting an integrated approach to responding to community needs.

DISAGGREGATE: None.

PURPOSE: The provision of health services is a new technical area for most employees of conservation organizations, and working with conservation organizations to provide health services is new to public health organizations. This indicator aims to capture instances where organizations implement a specific activity or group of activities outside their traditional sectors.

DATA SOURCES: Project records, secondary records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Some organizations already provide services across sectors as part of their mission or established programs. The goal of this indicator is to capture those organizations that make new or increased efforts to facilitate access to other sector services to communities outside of the longstanding tradition of their organization. This instance may be a single event or may be described once but comprising multiple activities/events in the context of a larger effort.

STRENGTHS & LIMITATIONS: This indicator does not measure the quality of the facilitation of services but it is an indication of the effort of organizations to participate in multi-sectoral or integrated projects.

6 NUMBER OF POLICY-MAKERS, MEDIA, AND SCHOLARS KNOWLEDGEABLE ABOUT OR AWARE OF A SPECIFIC PHE ISSUE

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This is a number count of policy-makers, media members, and scholars knowledgeable about or aware of a specific PHE issue. The issue should be chosen by the project in advance and at the beginning of project implementation for tracking over the life of the project. This issue should be very specifically defined to avoid error in counting whether an influential person has knowledge or awareness. Choosing a broad and over-arching topic (i.e., the connection between family planning and environment) is not useful in counting this indicator. Similarly, policy-makers, media, and scholars should not already be involved with or active in the PHE issue selected by the project. They should normally be those who are targeted and monitored by the project on the specific issue selected.

DISAGGREGATE: By issue.

PURPOSE: Persons of interest knowledgeable about the PHE issue is an indication that the program/project's messages reached those in power or those who are in a position of educating/impacting the public.

DATA SOURCES: Secondary sources, key informant interviews.

TIME FRAME: Semi-annually, annually.

DATA COLLECTION CONSIDERATIONS: Complications in collecting this indicator with accuracy arise with the definition of knowledge or awareness. Knowledge and awareness are difficult to measure objectively without the ability to perform pre and post tests for the persons of influence. Using key informant interviews where targeted policy-makers, media members and scholars are interviewed about their knowledge or awareness of a PHE issue can assist in confirming information for this indicator. When possible, using an interview as a baseline and then repeating the interview at a scheduled interval can provide information over time about increased knowledge or commitment to as specific PHE issue.

STRENGTHS & LIMITATIONS: This indicator does not give information on whether the policy-makers, media, or scholars are supportive of the specific PHE issue. It also does not measure the influential person's level of knowledge or depth of awareness of the issue.

7 PERCENT OF HOUSEHOLDS KNOWLEDGEABLE ABOUT OR AWARE OF A SPECIFIC PHE ISSUE

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This is a percentage of the households in the project's target area whose residents are knowledgeable about or aware of a specific PHE issue. The issue should be chosen by the project at the beginning of project implementation for tracking over the life of the project. This issue should be very specifically defined to avoid error in counting whether the person responding for the household has knowledge or awareness. Choosing a broad and over-arching topic (i.e., the connection between family planning and environment) is not useful in counting this indicator. The households included should normally be those who are targeted and monitored by the project on the specific issue selected for this indicator to be useful in determining whether the household gained the knowledge as a result of the PHE project.

Calculation

$$\frac{\text{\# of households surveyed that are knowledgeable about a specific PHE issue}}{\text{total \# surveyed households}} \times 100$$

DISAGGREGATE: PHE issue covered in survey.

PURPOSE: Household knowledge of a specific PHE issue may be an indication of the project's success in communicating the PHE issue or in the increasing awareness of the community to the integration between human health and the natural environment.

DATA SOURCE: Population-based survey.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: The specific PHE issues should be determined in advance, remain consistent, and be monitored over time. When collecting information at the household level in a population-based survey, special attention should be made not to bias results by suggesting answers.

STRENGTHS & LIMITATIONS: This indicator only measures knowledge and does not indicate behavior change or where the knowledge was acquired. The questions utilized to measure knowledge must be carefully worded and pretested to ensure accurate measurement.

8

PERCENT OF COMMUNITIES IN TARGET/PROJECT AREA RECEIVING ALL THREE PHE ELEMENTS

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: “All three PHE elements” means that the community receives at least one service from each of the population, health, and environment sectors from the same project in the same municipality or township over a defined period of time.

Calculation

$$\frac{\text{total \# of communities that receive at least one service each from the population, health, and environment sectors}}{\text{total \# of communities where the program is implementing activities}} \times 100$$

DISAGGREGATE: Target areas.

PURPOSE: This is meant to capture those projects that are integrating aspects of the project by providing family planning, health, and conservation-related activities in one community. This encourages the community to learn about the linkages between human behavior and the environment, as well as the health of the environment as integral to human health.

DATA SOURCES: Project records.

TIME FRAME: Quarterly, annually.

DATA COLLECTION CONSIDERATIONS: The project should determine in advance which activities fall under which category (population, health, or environment). If the services and activities are provided on a regional or country level, the denominator (the total number of communities where the integrated project is working) should remain constant to provide a baseline. This means that this indicator should be measured after the project has started implementation in all of the target communities and then measured over time to account for the degree to which each community is receiving all three elements.

STRENGTHS & LIMITATIONS: This indicator does not measure the quality of services provided or whether the services provided for each sector are consistent across all communities. In some cases, where there is a community-driven response for selection of activities, the ability of the project to provide at least one activity from all three sectors may be limited (according to community priorities and desires for services).

9 NUMBER OF ENABLING LOCAL ORDINANCES/POLICIES SUPPORTING PHE

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: An enabling policy refers to a policy that promotes integrated municipal and/or regional plans linking human and ecosystem health. This could be on a variety of topics or technical areas involving forests or marine ecosystems and different issues that enhance the quality of human life. The exact definition of “enabling” will differ by region, according to local ecosystem and community needs. Achieving this is a strong indication that elements in local, regional, and/or national government are supportive of PHE integration.

DISAGGREGATE: Country (if desired).

PURPOSE: Some PHE programs work toward changing policy to improve the implementation of PHE projects. The adoption of ordinances and policies supporting PHE sometimes involve allocation of budgets from public sources for integration of services and activities.

DATA SOURCES: Secondary records (laws).

TIME FRAME: Annually, or every two to three years.

DATA COLLECTION CONSIDERATIONS: Permission may be needed to research and track laws of another country or in a local setting. Strictly adhering to a predetermined definition of what exactly is an enabling ordinance or policy is important for consistency in collecting this indicator. Ordinances and policies generally take significant effort and time investment and may take years to achieve. If the ordinance also requires a budget allocation, projects could track the amount of funding appropriated connected with the PHE ordinance or policy.

STRENGTHS & LIMITATIONS: While this indicator gives information on increased willingness of officials to codify integration, it does not indicate whether there was a budget allotted for activities or service provision or whether any other action was taken in the community. However, most legislative processes involve long review and public debate and should be a good indication of the governmental commitment to integrating the locality/country approach to development.

10

NUMBER OF PLACEMENTS OF LINKED PHE MESSAGES IN PRINT AND ELECTRONIC MEDIA BY INDEPENDENT SOURCES

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: Placements by independent sources include those messages on linked topics (not single-sector topics related to specific projects) that are written by parties not associated or affiliated with the project. Print and electronic media include magazines, newspapers, radio, internet Web sites, etc. Each separate article is counted as one placement even if it was placed in multiple media sources.

DISAGGREGATE: None.

PURPOSE: When a third party publishes information or takes an interest through placing messages about integration in a public setting, it is an indication that the PHE project has reached an audience.

DATA SOURCES: Secondary sources.

TIME FRAME: Semi-annually, annually.

DATA COLLECTION CONSIDERATIONS: Tracking messages placed by independent sources may be difficult and time-consuming without a systematic approach to monitoring media sources. Identifying in advance the sources that will be followed may provide a more streamlined approach.

STRENGTHS & LIMITATIONS: While this will measure the independent sources' knowledge and awareness of a specific PHE issue, it does not give information about where the independent source received or learned that knowledge unless the source is quoted in the article. Also, the placement of a message does not consider whether the message was accurate or supportive of PHE.

Value-Added Indicators

This section is designed to capture an illustrative list of indicators for measuring the value-added indicators that the PHE projects have in multiple sectors. As previously stated, value-added indicators provide information about one or more groups of people or sectors that may not have been targeted in the intervention but are reached and impacted through the intervention. Another concept that goes hand in hand with value-added is that of synergy, indicating the project's success in implementing an approach that yields outcomes beyond those anticipated for single-sector population, health, or environmental programs. Hence, population, health, and environment are also listed as value-added categories here for those indicators that reach several sectors while the intended goal may be only to reach one or the other. The concept of synergy may also exist for those indicators listed in the sector categories earlier in this guide. However, measuring the added value in those sectors as a result of an integrated approach requires operational research and complicated methodologies. PHE projects are encouraged to pursue this type of research to continue to prove the organizational efficiencies inherent in a multi-sectoral or partnering approach to development.

As this list is illustrative, a few examples will be elaborated here to further clarify the concept of adding value. However, although there is a table indicating the categories that each of the indicators listed here may affect, it is the responsibility of each PHE project through its conceptual framework and specific objectives to determine which of these indicators may represent a value-added indicator in the project. It is the project's responsibility not only to select the indicators that may add value to another sector but also to select which sectors are affected, since the connections and implications can change depending on the context of the project's activities.

One example of a value-added indicator in a PHE project is “net dollar value of socially-marketed products sold.” The PHE project may intend to increase the use of condoms by providing commodities to local merchants and providing merchants with sales training, for example. In the process of reaching the goal of increasing use of condoms, the project may also diversify the livelihood of that merchant by providing an alternative or supplementary stream of income. The diversification of livelihood for that merchant is a value-added result.

Another example lies in the development of community-based natural resource management plans. While the goal of this activity for a PHE

project is generally to improve management of natural resources on a community level, the skills and methods that the community learns in developing the plan are improving participation in civil society and knowledge of democratic processes. The community forms a committee to make decisions about the use of their land and elects officials to head the committee through which they are learning about democratic election procedures and majority consensus-building. These are skills imparted to the community that go above and beyond the protection and/or improved management of their natural resources. Therefore, indicators related to the functioning of the natural resource management committee are governance value-added. The implication for women and youth participating in these committees adds another dimension of value-added related to gender equality and youth empowerment.

An example of an indicator that adds value in one sector as a result of work targeted at another sector is “number of children who show improvement on growth chart.” Many PHE projects work with communities to reduce practices that are detrimental to the environment. Some of the new or improved practices introduced by the PHE project will increase yields of crops/fish already used by the community or provide opportunities for new crops and fish to be consumed and sold by the community. Both of these activities could improve the nutrition of those in the community, thereby adding value that was unintentional by the PHE project. Measuring this added impact (for health) under circumstances where the project had programmed funds for another sector (agriculture or environment) serves to demonstrate the possibility for PHE and multi-sectoral programs to go beyond the stated objectives of the project.

Table 12 gives an overview of possibilities for value-added indicators. This list is illustrative; there are other categories. PHE programs are diverse and have broad impact, and projects have used many other value-added indicators. Use this section as a guide to value-added indicators, and not a definitive list of all such indicators for various approaches.

Table 12 – Value-Added Indicators by Sectors

VALUE-ADDED INDICATORS	Gender	Governance	Youth	Livelihood	Population	Health	Environment
1. Percent of communities with functioning community-based natural resource management committees		X					X
2. Number of educational sessions provided on new or alternative income-generating activities				X	X	X	X
3. Net dollar value of socially-marketed products sold				X	X	X	
4. Percent of men and women who know where to access family planning services	X				X		
5. Number of children who show improvement on growth chart						X	
6. Yield per area per year or cropping or fishing cycle				X		X	
7. Percent of youth participating in community-based natural resource management committees		X	X				X
8. Percent of leadership positions held by women on community-based natural resource management committees	X	X					X
9. Number of validated infractions reported in deputy logs		X					X
10. Number of fuel-efficient stoves distributed	X					X	X
11. Percent of youth who used a condom at last high-risk sex in the previous year			X		X	X	
12. Percent of adults who used a condom at last high-risk sex in the previous year	X				X	X	
13. Percent of men who support the use of modern contraception for themselves or their partners	X				X		
14. Percent of households with ventilation in cooking area	X					X	
15. Percent of children under five years of age with low weight for age (underweight)						X	
16. Average household consumption of firewood in target area	X			X		X	X
17. Household income				X			
18. Percent of households that earn income from new or alternative income-generating activities	X			X		X	X

Table 13 – Value-Added Indicators and Level of Measurement

Processes	Outputs	Outcomes
<i>Program-Based</i>		<i>Population-Based</i>
<ol style="list-style-type: none"> 1. Percent of communities with functioning community-based natural resource management committees 2. Number of educational sessions provided on new or alternative income-generation activities 	<ol style="list-style-type: none"> 3. Net dollar value of socially-marketed products sold 4. Percent of men and women who know where to access modern family planning services 5. Number of children who show improvement on growth chart 6. Yield per area per year or cropping or fishing cycle 7. Percent of youth participating in community-based natural resource management committees 8. Percent of leadership positions held by women on community-based natural resource management committee 9. Number of validated infractions reported in deputy logs 10. Number of fuel-efficient stoves distributed 	<ol style="list-style-type: none"> 11. Percent of youth who used a condom at last high-risk sex in the previous year 12. Percent of adults who used a condom at last high-risk sex in the previous year 13. Percent of men who support the use of modern contraception for themselves or their partners 14. Percent of households with ventilation in cooking area 15. Percent of children under five years of age with low weight for age (underweight) 16. Average household consumption of firewood in target area 17. Household income 18. Percent of households that earn income from new or alternative income-generating activities

1 PERCENT OF COMMUNITIES WITH FUNCTIONING COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT COMMITTEES

LEVEL OF MEASUREMENT: Process.

DEFINITION: An NRM committee is defined as an organized group of people who represent a defined geographic or political area and have the goal of improving management of the natural resources in the defined political or geographic area in which they reside. A functioning committee is defined as one that meets regularly at a defined periodicity (e.g., once a month).

Calculation

$$\frac{\text{\# of communities with functioning community-based NRM committees in target area}}{\text{\# of communities targeted for community-based NRM (by project) in target area}} \times 100$$

DISAGGREGATE: Targeted areas.

PURPOSE: It is assumed that the most effective natural resource management will arise from those communities that have active, functioning committees. This indicator can measure the extent to which this project activity is being implemented in the community. Once the project introduces the process and assists in the establishment of an NRM committee, this indicator will measure community ownership and dedication to the process.

DATA SOURCES: Secondary records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: This indicator measures the functioning of the committee, not of the NRM plan. The presence of the project (i.e. asking to see meeting notes and to attend meetings) may change the way the committees function and may be an incentive for the committees to meet regularly.

STRENGTHS AND LIMITATIONS: The independent functioning of a committee is a governance value-added indicator. The fact that the committee is meeting on a regular basis shows a continued commitment to natural resource management. The committee is defined as functioning if meeting regularly, but this does not indicate the quality of the meetings, whether the committee has the needed expertise to develop an environmentally-sound plan, and whether the committee has made progress in drafting or finalizing a NRM plan.

2 NUMBER OF EDUCATIONAL SESSIONS PROVIDED ON NEW OR ALTERNATIVE INCOME-GENERATING ACTIVITIES

LEVEL OF MEASUREMENT: Process.

DEFINITION: This count includes the total number of training/educational sessions provided by the project to introduce members of the community to new livelihood options. A new income-generating activity is any income strategy that was not practiced by the community previously. It is intended to diversify livelihoods with a goal of locally-based sustainability by diversifying the income stream and/or providing livelihood alternatives to resource extraction and destruction.

Examples of new income-generating activities are numerous. They include any agricultural activity that is new to a community, such as home gardening, new crops or livestock, or alternative farming techniques. New activities can also involve fishing or forestry, as well as tourism, handicrafts, micro-enterprises, women's cooperatives, and many other enterprises. Alternative income-generating activities usually stem from skills the community already has or resources to which the community already has access.

DISAGGREGATE: Type of income-generating activity.

PURPOSE: Educational/training sessions are needed to provide the information, skills, confidence, and inputs people need to add or switch to a new income-generating activity. Rural populations need to be occupationally flexible, spatially mobile, and often cannot be dependent on agricultural income generating activities alone to provide sufficient yields or income. Many of the people who live in areas with high biodiversity are poor and depend directly upon the products of a healthy ecosystem to meet their basic needs. Economic pressures increase the need to exploit natural resources and can lead to soil erosion and species loss. Poverty and lack of knowledge about alternative livelihoods are drivers of biodiversity loss.

Alternative farming/fishing techniques can lead to improvements for the environment, increased yields for market, better nutrition, and general family well-being. Sometimes communities develop nutritional deficiencies that result from depletion of essential local plant and animal species. Alternative income-generating activities that allow local species to recover can lead to availability of essential nutrients, if the species are managed in a sustainable way.

Training sessions may lead to the community's increased local capacity, empowerment, and the ability to make group decisions about resources effectively. Livelihood diversification has the potential to positively affect poverty, income distribution, yields, nutrition, food security, health, capital assets, conservation of ecosystems and species, gender roles, and vulnerability (e.g., shielding communities from environmental and economic shocks, natural disasters, weather extremes and seasonality).

DATA SOURCES: Project records.

TIME FRAME: Monthly, quarterly.

DATA COLLECTION CONSIDERATIONS: The project's logbook should include the following information about the educational session: dates held, length of training and total number of sessions held, frequency of occurrence, specifics on type of training, names of people who did the training, list of training materials distributed, location of sessions, breakdown of people in attendance (e.g., percent adults, percent women, names, ages, and genders, etc.), and a list of any financial aid or resource inputs given to the community to help them make the change.

A form can be developed that is standardized and used by all project community educators for easy comparison and assembling of information across the project. Other items of information can be added to the standardized form as fits the specific needs of the project.

STRENGTHS & LIMITATIONS: This is easy to collect through careful record-keeping. However, using only the number of training sessions as an indicator does not assess the quality of the training or how well-equipped and empowered the participants feel after the sessions to diversify their income-generation activities.

3

NET DOLLAR VALUE OF SOCIALLY-MARKETED PRODUCTS SOLD

LEVEL OF MEASUREMENT: Output.

DEFINITION: “Socially marketed” products include contraceptives, condoms, insecticide-treated bed nets, oral re-hydration therapy, and other products sold to improve community health. The net dollar value is the amount of money that a community-based distributor earns as profit.

Calculation

(total amount that the products are sold for) – (total amount a community-based distributor spends on products) = net dollar value

This indicator should be calculated for a specified period of time, e.g., monthly, quarterly, or annually. If the PHE project has more than one distributor, the time frames should be identical to allow comparisons among distributors. Local currencies can be converted into U.S. dollars using the most current exchange rate. Sellers should keep records of number and types of commodities, supply sources, and the number and types of commodities sold.

DISAGGREGATE: By product type or by distributor.

PURPOSE: Social marketing seeks to influence social behaviors and to benefit both the target audience and society as a whole. In social marketing sales, products and services are sold at subsidized prices rather than given away in order to motivate commercial-sector involvement. Many PHE projects support distributors in marketing and selling a health-related commodity which encourages entrepreneurship as well as improves the health impacts in the target community.

DATA SOURCES: Sales logs of each distributor.

TIME FRAME: Depends on program/project goals; common time frames are monthly, quarterly, and annually.

DATA COLLECTION CONSIDERATIONS: The emphasis here is on the net dollar value, meaning the amount of profit that the seller receives after accounting for the purchase price and sale price of the commodities.

STRENGTHS & LIMITATIONS: It is important to track this indicator over time and in relation to marketing campaigns that the PHE project is focusing on to look at trends between the sales of the products and the marketing campaign, if possible.

4 PERCENT OF MEN AND WOMEN WHO KNOW WHERE TO ACCESS MODERN FAMILY PLANNING SERVICES

LEVEL OF MEASUREMENT: Output.

DEFINITION: “Modern” family planning methods refer to the following: pill, IUD, Norplant implant, injection, condom, spermicides, diaphragms, and sterilization (tubal ligation and vasectomy).

Calculation

$$\frac{\text{\# of adults age 15-49 who know where to access modern family planning services}}{\text{total \# of adults age 15-49 in the target area}} \times 100$$

DISAGGREGATE: Men/women.

PURPOSE: This indicator provides program managers with a basis for assessing whether promotional or awareness-raising activities are required to educate men and women on where they can obtain modern family planning methods. This indicator also provides information on gender differences in knowledge of where to obtain family planning methods.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Without prompting, adults should be asked to name a location where they can obtain family planning. For this indicator to have meaning, both men and women should be surveyed.

STRENGTHS & LIMITATIONS: Asking respondents to name a specific location prevents respondents from giving false affirmative answers to please the interviewer. However, this indicator does not measure knowledge or use of family planning services.

5 NUMBER OF CHILDREN WHO SHOW IMPROVEMENT ON GROWTH CHART

LEVEL OF MEASUREMENT: Output.

DEFINITION: The number of children under five years old (0-59 months) who show improvement on a standardized growth record for the proper age (from birth to five months; six months to 23 months; and 24 months to 59 months). Health center workers will plot a child's height/length and weight against charts, and then calculate the child's weight for length/height and body mass index (BMI) for age. The four standardized growth charts are: length/height for age; weight for age; weight for length/height; and BMI for age. Improvement on any of these four growth charts can be counted for this indicator. Improvement depends on the gender and type of malnutrition. The standard charts for all types of malnutrition are available on WHO's Web site at www.who.int.

DISAGGREGATE: None.

PURPOSE: Basic growth assessments determine whether a child is growing normally or has either a previous, current, or possible future growth problem that should be addressed. New WHO growth charts provide prescriptive standards for normal growth, rather than simple comparisons to other children in the region.

DATA SOURCES: Service statistics.

TIME FRAME: Quarterly.

DATA COLLECTION CONSIDERATIONS: Using service statistics to collect this indicator is not representative of the general population. When collected using service statistics based at a health facility or through outreach performed by the project, this can show improvement in child nutrition among the clients that the project aims to serve.

STRENGTHS & LIMITATIONS: Data collected using current WHO growth charts will be able to identify whether children are growing within healthy norms instead of only comparing them to other children in the region. Charts are specific for different age groups, and these new standards will better identify stunted and overweight/obese children. However, because this indicator was newly adopted, recent data will not be fully comparable to earlier data. Health care workers may not be trained on how to use the newly revised charts properly. Also, this indicator could increase if more children participate in growth monitoring even if there is no improvement in malnutrition.

6 YIELD PER AREA PER YEAR OR CROPPING OR FISHING CYCLE

LEVEL OF MEASUREMENT: Output.

DEFINITION: Yield is the total amount of usable/edible or sellable crop or marine product. This measures land or marine productivity.

Calculation

$$\frac{\text{amount of usable, edible, or sellable crop, marine product (by weight or volume)}}{\text{area planted with the selected crop (in hectares) or the marine area fished (in nautical square miles)}} \times 100$$

The numerator may be measured by weight, volume or total number (for harvested crops/marine products). If farmers/fishers are paid by weight, volume or total number for their crops or fish, then billing records may provide useful data on the numerator.

Volume may be measured in many ways (e.g., by bag, basket, cans, bundles, crates, etc). It is important to standardize the volume measurement so that it represents the same, fixed quantity on average. This can be achieved by weighing or measuring the volume of several samples from each household or farm using the same size container to calibrate the measurement at the beginning. The volume measurement can also be standardized by collecting the data at the point of sale. To reduce recall bias, data collection should occur near the end of cropping or fishing cycles, which may be seasonal.

Hectares should be used to measure land area. One hectare is an area of 10,000 square meters. In the United States and Canada, an acre may be used (1 hectare = 2.471 acres). Square kilometers should be used to measure aquatic areas. (In the United States and Canada, nautical miles are more commonly used: 1 square kilometer = 0.292 nautical square miles.)

DISAGGREGATE: Crop or marine product; geographic area.

PURPOSE: Project staff may need to know how the improved agricultural/marine practices affect the yields of farmers and fishers. Increased yields can lead to improved economic and health outcomes. Increased yields can also be linked with indicators that measure household income and/or child protein intake and nutritional status.

DATA SOURCES: Secondary sources (farmer or fisher reported estimates); farm surveys (the “crop cutting” method).

TIME FRAME: Annually, or corresponding with crop/fish/product harvesting cycles.

DATA COLLECTION CONSIDERATIONS: The total area for all plots combined under each crop system should be calculated and the yield determined for each cropping system. Separate yields should not be calculated for each plot and combined. The denominator (total area planted for land or total area fished for marine) can be measured by a transect survey for small areas; by aerial survey/photographs for larger areas (i.e., flying over area to measure distances or use of satellite images); or by traveling the distances by boat or via scuba diving for marine areas. At least one person experienced in this type of measurement should be involved in the denominator measurements.

Many farmers/fishers likely already measure their crop/marine harvests and may already have accurate measurements of the areas planted with specific crops or areas fished. It is possible that existing data may be used. Farmer/fisher estimates may vary in accuracy. However, using the farmer/fisher estimate method is generally simpler, less expensive and more efficient.

Data should also be collected on when specific crops or marine species are harvested throughout the year. Data collection should occur early in each planting or fishing season to measure the area planted or fished, and right after each harvest to measure yields.

STRENGTHS & LIMITATIONS: This indicator may not only provide data on the impact of the improved resource practice but also serve as an incentive for farmers/fishers to continue with and expand on the use of improved practices. Data are relatively easy and inexpensive to collect, especially since most farmers/fishers already measure their yields. This indicator is widely used in the coastal resource management field and is sometimes called “catch per unit effort.” However, external factors can affect the yield. Improved natural resource management practices do not necessarily result in increased natural resource yields.

7 PERCENT OF YOUTH PARTICIPATING ON COMMUNITY-BASED NATURAL RESOURCES MANAGEMENT COMMITTEES

LEVEL OF MEASUREMENT: Output.

DEFINITION: “Participation of youth” is defined as youth aged 15-24 regularly attending NRM committee meetings. Regular attendance means being present and counted as a participant at each meeting held (apart from occasional illness or need for absence). The frequency of meetings is determined in advance by the committees and in consultation with the project managers.

Calculation

$$\frac{\text{total \# of community youth age 15-24 participating on the NRM committee}}{\text{total \# of youth age 15-24 in the community}} \times 100$$

DISAGGREGATE: By community.

PURPOSE: The percent of youth participating on the committees is important because it reflects an ongoing, generational commitment and interest in the work of the committee. Monitoring this indicator can give indication to the project of the need to discuss more open policies toward youth participation or to create strategies with the community to increase youth participation in making decisions on the use of natural resources. There is the potential for youth to act as leaders in behavior change communication and adoption.

DATA SOURCES: Secondary sources (meetings notes with participants listed, membership lists).

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Qualitative interviews with youth may also be used to assess their perceptions of involvement in the committees and to obtain more details on how youth are contributing to the committees. For instance, youth may not be participating or attending meetings due to the timing of the meeting, especially if meetings are held during school hours or after school when the youth may be doing homework or other chores. The increase or decrease in the percent of youth participating may be due to a variety of factors that should be considered and investigated.

STRENGTHS AND LIMITATIONS: Being involved in the committee does not necessarily ensure that youth have the same power and decision-making ability as adults do. There may be cultural factors that prevent or inhibit the youth from speaking up or challenging the views of others.

8

PERCENT OF LEADERSHIP POSITIONS HELD BY WOMEN ON COMMUNITY-BASED NATURAL RESOURCES MANAGEMENT COMMITTEES

LEVEL OF MEASUREMENT: Output.

DEFINITION: A “leadership position” is any position that needs to be applied for with a vote taken to determine who is elected to the position, resulting in the chosen person having commanding authority or influence.

Calculation

$$\frac{\text{total \# of women with a leadership position on the NRM committee}}{\text{total \# of available NRM leadership positions}} \times 100$$

DISAGGREGATE: Community.

PURPOSE: Women and men have different gender-based roles and responsibilities; different knowledge of, access to, and control over natural resources; and different opportunities to make decisions that affect environmental management. For example, in some regions men are much less involved, or not involved at all, in gathering, carrying, or providing water or firewood for household use and activities such as weeding and planting. Therefore, men may not appreciate the importance of these limited resources. Often, an NRM committee made up of only men makes decisions on issues that affect primarily women, such as regarding tasks that are typically completed by women. This indicator reflects gender equity and the ability of women to have a decision-making role in committee plans, actions, and control of resources. Differences in gender, age, and ethnicity may influence the use of natural resources. Increased participation of women on community-based NRM committees may lead to decreased local inequities, if gender equity and a leadership role for women is promoted. Exclusion of women may marginalize them from assets such as water or forest products and training, credit or other benefits that go only to the committee members.

DATA SOURCES: Secondary records (membership and officers list).

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: Qualitative interviews with women may also be used to assess their perceptions of involvement in the committees and to obtain more details on how women are contributing to/involvement in the committees. In these interviews women can be asked for exact details of their leadership position responsibilities.

STRENGTHS AND LIMITATIONS: If women become empowered and more involved in decision-making and community-based group activities, this may lead to their input in not only natural resource use decisions but also other decisions such as education, health and family planning decisions. However, holding a leadership position does not necessarily ensure that women have the same power and decision-making ability as men do. There may be cultural factors that prevent or inhibit the women who have leadership positions from speaking up or challenging the views of others. Reserving a certain number of leadership positions for women will not be effective if women play only a ceremonial role and stay silent.

9

NUMBER OF VALIDATED INFRACTIONS REPORTED IN DEPUTY LOGS

LEVEL OF MEASUREMENT: Output.

DEFINITION: This indicator measures the total number of infractions reported by officers (or community members) and approved as authentic by a supervisor. Infractions are defined as illegal violations that are discovered by enforcement officers and officially recorded in the officers' logbooks. Validated infractions are those infractions that are verified by a designated supervisor as authentic. The decision as to what to consider authentic should be based on the plausibility of the reported infraction and, whenever possible, evidence such as the confiscated goods, photos of the violation, or actual fines/penalties collected. Supervision to validate infractions and provide support to officers should occur monthly or at a minimum on a quarterly basis and may be provided by the project manager.

DISAGGREGATE: Community-reported (if desired).

PURPOSE: This is an indicator of how well illegal deforestation, hunting, and other prohibited activities are controlled or prevented. The number of community-reported violations may indicate a local group effort and commitment to natural resource conservation. Validating infractions may prevent false or over-reporting of enforcement activities and is an indication of the level of supervision the officers received in their work. This indicator demonstrates progress towards improved governance, a key aspect of value-added programs.

DATA SOURCES: Secondary records, project records.

TIME FRAME: Quarterly.

DATA COLLECTION CONSIDERATIONS: When appropriate (where projects are working closely with government authorities), information may need to be jointly collected from project and government records. Officers should be given a space in their logbooks or on a standardized infraction report to record their total number of daily infractions, nature of the infraction (e.g., species affected), location of the infraction (using GPS when possible), and details on how the infraction came to their attention (e.g., community-reported), number of perpetrators, description of the perpetrators, quantity of resources affected, and what the final result was (e.g., caught the perpetrators in the act, or the perpetrators had already fled the area, etc). Supervisors should use these logbooks to record their assessments of the reported infractions and whether they validated the infraction.

An increase in infractions could indicate more effort from the officers, increased illegal activity in the area, or a combination of the two. If collected fines are used as a measure of validation, this indicator will be lagging since it may take months or years for the fines to be actually collected.

STRENGTHS & LIMITATIONS: The ability to validate an infraction depends, in part, on the nature of the infraction and also on how dangerous the field conditions are. In some cases, it may be possible to bring in confiscated wildlife products as evidence of an infraction. In other cases, this may not be possible due to remote field conditions. It is also important that the project does not give rewards or benefits associated with increased infractions to avoid creating incentives for officers to falsify records of infractions.

10 NUMBER OF FUEL-EFFICIENT STOVES DISTRIBUTED

LEVEL OF MEASUREMENT: Output.

DEFINITION: Fuel-efficient stoves are enclosed and often employ an elbow shape to provide a combustion chamber and insulation to increase the heat available to cook food. They conserve heat and have a chimney/vent to divert toxic smoke out of the cooking area. The specific type of fuel-efficient stove varies; therefore the type of stove to be included in the measurement of this indicator should be determined by the project in advance. Traditional indoor cooking stoves are associated with exposure to harmful air pollution. Fuel-efficient stoves function by burning wood more slowly and increasing the amount of heat trapped and effectively used. These features reduce total cooking time and produce less smoke.

PURPOSE: Switching to fuel-efficient stoves can have direct impacts on both forest and human health by limiting wood collection and ecosystem disruption and by minimizing human exposure to pollutants and related acute respiratory diseases (especially among women and children). Use of fuel-efficient stoves is thought to reduce household fuel wood use by 50% to 70%. In addition to the environmental benefits, reducing the time needed to collect fire wood each week and the time needed for cooking may free up time for essential health, education and income-generation activities, especially among women and girls. In areas where people buy fire wood, the money saved may be invested in other important areas. Stoves may also provide other advantages such as additional indoor heat for families, more bathing opportunities and increased hygiene/less disease, reduced risk of burns as compared with open fires, and a reduction in back/neck injuries due to carrying heavy fire wood. Many designs of fuel-efficient stoves have also been linked with the reduction in the incidence of acute respiratory illnesses by reducing the amount of indoor air pollution created by traditional biomass fuel burning stoves.

DATA SOURCES: Project records.

TIME FRAME: Annually.

DATA COLLECTION CONSIDERATIONS: A standard form should be used to keep track of these data. The form should include a place to note the dates of distribution, total number of stoves distributed, a list of the actual households and addresses where the stoves went to, and the name of the village or community. Prior to distributing the new stoves, doing a baseline assessment would be useful.

STRENGTHS & LIMITATIONS: Data on the number of stoves distributed should be easy to obtain and track over time. However, the distributed stoves only have an impact if they are used. This indicator does not measure the existence of a mechanism in the target area for timely repairs/maintenance to be sure the stoves are kept in use. The size and style of each stove should be designed for the specific setting (country, region, house size/layout, cultural preferences, etc.) where it will be distributed.

Firewood Collection and Gender-Based Violence

Fuel-efficient stoves reduce the consumption of firewood, thereby conserving more of the natural environment and decreasing smoke in the cooking area which can lead to respiratory infections. However, they can also serve to protect women and girls by reducing their time spent searching for and collecting firewood.

In many regions of the world, women and girls collect firewood and fuel used for cooking or for income. In some regions, especially among refugee and displaced populations, women and girls are at risk of gender-based violence (GBV), including rape or physical assault while collecting firewood for their families. Female refugees interviewed by Refugees International cited the threat of violence while collecting firewood as one of their top concerns.

In households with less need for firewood, women and girls will spend less time collecting firewood and also may not need to travel as far. Walking far from home to find firewood increases the risk of GBV because women may have to walk in isolated, unknown areas or go near military posts or checkpoints where assaults are more likely. Additionally, women can be trained to construct and maintain fuel-efficient stoves. This alternative income-generation activity may further reduce the risk of GBV by reducing the need to sell firewood.

Fuel-efficient stoves can enhance the lives of women and girls in several other ways, including reducing risk of respiratory infections, improving their natural environment, and freeing time for other income-generating activities.

11

PERCENT OF YOUTH WHO USED A CONDOM AT LAST HIGH-RISK SEX IN THE PREVIOUS YEAR

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This indicator measures the percent of youth aged 15–24 who used a condom the last time they had high-risk sex. “High-risk” sex is defined as sex with any non-marital, non-cohabitating partner. This indicator relates to sexual activity within the previous 12 months.

Calculation

$$\frac{\text{\# of sexually active youth age 15-24 that used a condom the last time they had high risk sex in the last 12 months}}{\text{total \# of youth age 15-24 who report having high risk sex in the last 12 months}} \times 100$$

DISAGGREGATE: By age group (15–19, 20–24); sex.

PURPOSE: Consistent and correct condom use has been shown to reduce the risk of HIV and other sexually transmitted infections and to prevent unintended pregnancy. Increasing condom use with non-marital, non-cohabitating partners is a goal of many reproductive health programs, including those aimed at youth. PHE programs frequently sell condoms or promote their use through social marketing campaigns; this indicator can be used to assess both men’s and women’s adoption of these messages.

DATA SOURCE: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: This indicator measures condom use in high-risk sexual activity among both married and unmarried youth within the last 12 months. The target area or region for both the numerator and denominator should be the same. The target area should be defined in advance and remain constant over the course of the project for consistent comparison over time. Collection of these data requires gathering sexual histories from several previous partners, i.e., asking about condom use with the last three sexual partners within the previous year.

STRENGTHS AND LIMITATIONS: Measuring condom use among the last three sexual partners within the last year reduces recall bias. Questions about condom use and sexual activity are taboo for some audiences, particularly youth in many cultures, and this may lead to reporting bias. Youth may under-report their sexual behaviors, especially high-risk behaviors. Additionally, condom use at last sex does not measure either consistent or correct use of condoms.

12 PERCENT OF ADULTS WHO USED A CONDOM AT LAST HIGH-RISK SEX IN THE PREVIOUS YEAR

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This indicator measures the percent of men, ages 15-59, and women, ages 15-49, who used a condom the last time they had high risk sex. "High risk" sex is defined as sex with any non-marital, non-cohabitating partner. This indicator measures sexual activity within the previous 12 months.

Calculation

$$\frac{\text{\# of sexually active men age 15-59/women age 15-49 that used a condom the last time they had high-risk sex in the last 12 months}}{\text{total \# of men age 15-59/women age 15-49 who report having high-risk sex in the last 12 months}} \times 100$$

DISAGGREGATE: By age group; sex.

PURPOSE: Consistent and correct condom use has been shown to reduce the risk of HIV and other sexually transmitted infections and to prevent unintended pregnancy. Increasing condom use with non-marital, non-cohabitating partners is an important component of programs aimed at reducing HIV infections among sexually active adults, both married and unmarried. PHE programs frequently sell condoms or promote their use through social marketing campaigns; this indicator can be used to assess both men's and women's adoption of these messages.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: This indicator measures high-risk sexual activity among married and unmarried men and women within the last 12 months. The target area or region for both the numerator and denominator should be the same. The target area should be defined in advance and remain constant over the course of the project for consistent comparison over time. Collection of these data requires gathering sexual histories from several previous partners, i.e., asking about condom use with the last three sexual partners within the previous year.

STRENGTHS & LIMITATIONS: Measuring condom use among the last three sexual partners within the last year reduces recall bias. Although condom use within marriage may be low, this indicator aims at measuring condom use outside of formalized unions. However, questions about condom use and sexual activity are taboo for some audiences, and this may lead to reporting bias. Additionally, condom use at last sex does not measure either consistent or correct use of condoms.

13 PERCENT OF MEN WHO SUPPORT USE OF MODERN CONTRACEPTION FOR THEMSELVES OR THEIR PARTNERS

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: “Support” for modern contraception can be defined by a man’s acceptance of, communication about, or practice of any modern method (condom, pill, injection, implants, IUD, diaphragm, spermicides, and male and female sterilization) utilized to delay or prevent pregnancy with their partner. Men’s supportive attitudes can be ascertained by asking men questions about his attitudes (“Do you approve or disapprove of your wife’s or partner’s use of a contraceptive method to prevent pregnancy?”); communication with their partner (“Have you ever told or otherwise let your wife or partner know that you approve or disapprove of her using contraception?”); or practices (“Do you currently use any form of contraceptive to delay or prevent pregnancy?”). For this indicator, “partner” is defined as within a marital or cohabitating union.

Calculation

$$\frac{\text{\# of men age 15-59 who support modern contraceptive use by themselves or their partners}}{\text{total \# of men age 15-59 surveyed}} \times 100$$

DISAGGREGATE: None.

PURPOSE: In many developing countries, men are either not involved in reproductive health decision-making or have negative attitudes toward contraceptive use. These negative attitudes result in a greater number of unplanned pregnancies and can increase transmission of HIV and other sexually transmitted infections. More supportive attitudes can have the opposite effect, especially if coupled with improved communication and consistent practice.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Support can be determined in multiple ways depending on the specific aims of the program. Determining attitudes and beliefs is tricky, and reporting bias is possible. Asking these questions in a matter-of-fact manner can reduce the chance of reporting bias and increase the accuracy of results. Men’s attitudes for this indicator could be determined using structured interviews or surveys in the general population. Alternatively, although asking men about their own attitudes is preferable, women can also be asked about their partner’s attitudes and beliefs. Women who use family planning methods may be asked whether their partner/spouse is aware of their use.

For these data to be valid, the questions need to be measured the same way for the same population so that comparisons can be made across time.

STRENGTHS AND LIMITATIONS: PHE programs often work on gender issues, especially to include men in the counseling and decision-making process for contraceptive use. However, answers to these questions are subject to reporting bias, especially for men who believe their attitudes deviate from socially held or interviewer beliefs. Additionally, this is an indicator of modern contraceptive use to delay or prevent pregnancy, not for protection against sexually transmitted infections, including HIV. Caution must be used to determine the motivation for the contraceptive use, especially for condoms. Lastly, support for use of modern contraceptives is not an indicator of consistent or correct use.

14 PERCENT OF HOUSEHOLDS WITH VENTILATION IN COOKING AREA

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: A ventilated cooking area should have some duct or hood that allows cooking smoke to escape through the roof or out a window.

Calculation

$$\frac{\text{\# of households that have ventilated cooking areas}}{\text{total \# of households in the target area}} \times 100$$

DISAGGREGATE: None.

PURPOSE: Indoor air pollution is a major cause of morbidity and mortality in developing countries. Un-ventilated cooking areas, especially when solid fuels are used for cooking, greatly increase the risk for developing lung cancer as well as acute or chronic respiratory diseases. Women are disproportionately affected as they do most of the cooking.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

DATA COLLECTION CONSIDERATIONS: Determining what constitutes ventilation may be a challenge. Interviewers should ask heads of households if the cooking area has ventilation. Additionally, interviewers should request to observe the available ventilation.

STRENGTHS AND LIMITATIONS: Data for this indicator are easily collected. This indicator can quickly estimate where to target interventions. However, exposure to and effects of indoor air pollution depend on many factors, such as type of cooking fuel used, whether or not sleeping and cooking areas are separated, and the amount of time spent in cooking areas.

15 PERCENT OF CHILDREN UNDER FIVE YEARS OF AGE WITH LOW WEIGHT FOR AGE (UNDERWEIGHT)

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This measures the percent of children under five years (0–59 months) who weigh –2 standard deviations (S.D.) of the U.S. National Center for Health Statistics/WHO’s reference population’s median weight-for-age or less. See Tables 14 and 15 on page 143 for WHO’s recommendations.

The standard deviation, or “Z-score,” is the simplest way of making comparison to the reference population. The Z-score is defined as the difference between the value for an individual and the median value of the reference population in the same age or weight, divided by the standard deviation of the reference population. The median is the value at exactly the mid-point between the largest and the smallest.

The cut-off points for different malnutrition classifications under the WHO child growth standards are:

Mild: Between –1 and –2 standard deviation

Moderate: Between –2 and –3 standard deviation

Severe: Below –3 standard deviation

Children who are below –2 standard deviation from the median are considered underweight for their age

Calculation

$$\frac{\text{the \# of children under five who weigh less than } -2 \text{ S.D. of the reference population median weight-for-age}}{\text{the total \# of surveyed children under five}} \times 100$$

DISAGGREGATE: None.

PURPOSE: The low-weight-for-age measure identifies the condition of being underweight for a specific age. It reflects chronic and acute under-nutrition and measures the health and nutritional risk in a population. Improvements in crop yields or diversification in food sources associated with improved environmental or agricultural practices may impact this indicator.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years.

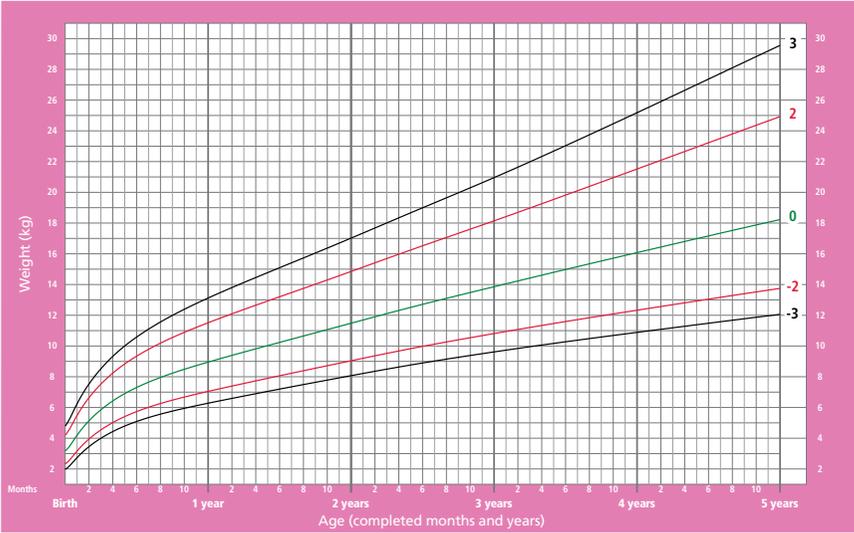
DATA COLLECTION CONSIDERATIONS: The weight and date of birth for all children under five (child's age in months is required) should be collected from their mothers. If the mother cannot recall the month her child was born, a local calendar should be used to assist her. A hanging scale can be used to measure children's weight; alternatively, an electronic scale can be used by first recording the mother's weight while holding the baby and then subtracting the mother's weight while standing alone. Weights should be recorded in kilograms to one decimal point.

STRENGTHS & LIMITATIONS: Weight-for-age measures reflect present and past under-nutrition. This indicator can be used for continuous assessment of nutritional progress and growth, to identify infants and children with poor health and nutrition, and for interventions tailored to causes of poor growth. However, inaccuracies stemming from a caretaker's estimated age of the child, as well as differences in weighing practices and instruments, can result in less reliable data. Additionally, the composite nature of this index makes interpretation difficult.

Table 14 – Girls’ Z-Score Chart for Monitoring Weight-Related Malnutrition

Weight-for-age GIRLS

Birth to 5 years (z-scores)

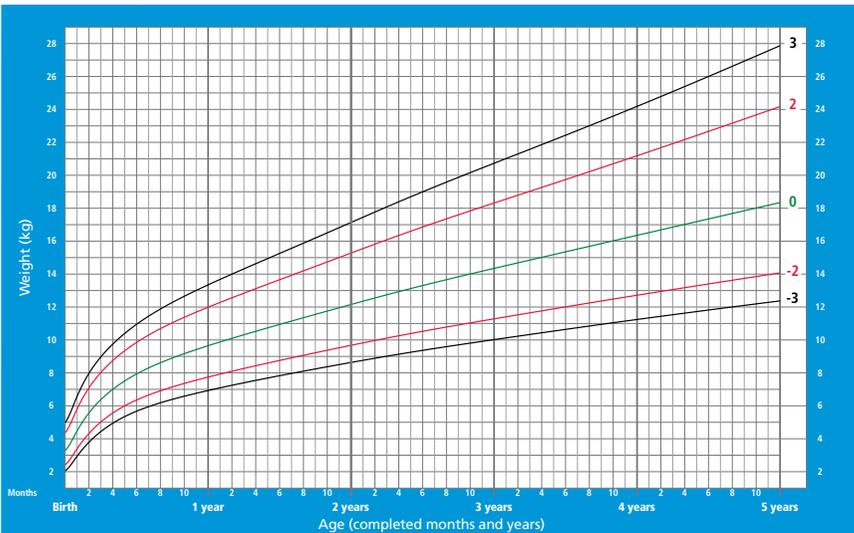


WHO Child Growth Standards

Table 15 – Boys’ Z-Score Chart for Monitoring Weight-Related Malnutrition

Weight-for-age BOYS

Birth to 5 years (z-scores)



WHO Child Growth Standards

Value-Added

16 AVERAGE HOUSEHOLD CONSUMPTION OF FIREWOOD IN TARGET AREA

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This measurement reflects the forest impact resulting from fuel-efficient stove distribution and also reflects how much time people need to invest in fire wood collection.

Calculation

(volume or weight of a typical bundle of firewood collected) x (# of bundles a household collects per week)

This number will reflect a week's worth of collected firewood. To measure over a larger period of time, multiply by the number of weeks (e.g., by six for a six-week estimate).

At the beginning of project implementation, weigh or measure the volume of several "typical" bundles of firewood in order to calibrate this measurement accurately. In cases where the size/weight of bundles is not known, time spent collecting firewood can be used as a proxy.

PURPOSE: This indicator provides information on the local deforestation rate for fuel needs. Switching to fuel-efficient stoves can have direct impacts on the forest by reducing wood consumption. Use of fuel-efficient stoves is thought to reduce household fuel-wood use by up to 50%. The need to collect firewood may pressure people to use protected areas for this purpose illegally, leading to conflicts with enforcement officers and demands on the officers' time. Reducing overall firewood consumption may also benefit protected areas and species conservation. Also, reduction of firewood for household use may have positive effects on respiratory health.

DATA SOURCES: Population-based surveys.

TIME FRAME: Every two to five years (seasonally).

DATA COLLECTION CONSIDERATIONS: Surveys should ask how much firewood is collected on a weekly basis (e.g., volume of a typical bundle collected and how many bundles are collected per week), if any fire wood is bought rather than collected, what the firewood is used for (cooking, heating, lighting, burning bricks, etc.), and what areas of the forest the firewood is taken from. It may also be desired to have data on the age, gender, and other details of who does the actual firewood collection.

STRENGTHS & LIMITATIONS: When the size of an average bundle is known in advance, this is an accurate measure of consumption at a household level and is not complicated to collect. However, firewood may still be used for other purposes besides cooking. Trends in firewood consumption over time may vary due to external factors that have nothing to do with the type of stove distributed.

17 HOUSEHOLD INCOME

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This is the total monetary amount (converted into dollars) of all combined household income for the month. This is equal to the total monetary market income paid to all household family members for crops, fish, products or services for a given period minus the input, labor, transportation and transaction costs, converted to U.S. dollars.

Income includes both goods and services that are sold, traded, exchanged, or performed for money. Goods are defined as the value and quantity of marketed goods from forest and other wooded land (or marine areas). Services are the value of market services in forest or marine areas (e.g., tourism, labor provided for logging) and services unrelated to natural resources (e.g., teaching).

DISAGGREGATE: By project; community; specific forest or marine products.

PURPOSE: The natural environment is an income source and many livelihoods are directly linked to forests, fisheries, farming, and use of other natural resources especially among the poor living in rural areas of developing countries. If managed properly, income from natural resources can reduce poverty over the long-term by providing increased household income, more secure livelihoods, and better education and health.

Total monthly household income reflects economic wealth and ability to buy needed items such as food and medicines or health care. The breakdown of income by specific forest or marine products can reflect local environmental degradation and how much of any particular resource is being exploited.

DATA SOURCES: Population-based surveys.

TIME FRAME: Monthly, quarterly, or annually, depending on design.

DATA COLLECTION CONSIDERATIONS: Data on income from households should be complimented by price data to consider price differentials between regions. Price data may be obtained from various sources including field visits/observations particularly at markets, qualitative interviews, ecotourism records, harvest records, market records, cooperative registries and receipts, fishing records and agricultural surveys. Depending on whether the local economy is formal or informal (or mixed), different approaches will be needed. Income will be in various local currencies. For comparisons, income needs to be converted into a common unit (e.g., U.S. dollars) and comparisons across time will need to account for inflation.

STRENGTHS & LIMITATIONS: Total income in dollars is a reflection of the market value for specific goods in the specific area and does not describe the total number of species or products extracted from the forest or marine ecosystem. Monthly data will measure seasonality in income better, but is very expensive to collect.

Special Consideration for Interpreting Household Income

Measuring changes in household income over time is important for many PHE programs. However, collecting data to measure household income accurately and appropriately goes well beyond standard population-based surveys. Detailed questionnaires and surveys are warranted at both the household and community level, and interpretation of data is complex. In particular, there are several issues to consider in the measurement and interpretation of income of rural households, including the following:

- Households have multiple sources of income, both monetary and non-monetary. A full picture of household income includes the production and sale of all goods for market as well as all forms of labor: formal, informal, and temporary (migration for brief periods of time). Non-monetary sources may include goods and services that are traded or exchanged.
- Consideration must be given to the family size and to the number of working adults in the household. Also, variation within households might also occur due to migration of household members away from the household, members entering the labor force, or members moving to other households due to marriage.
- People tend to under-declare income and to omit declaration of income from informal or illegal sources.
- There are expected variations in household income due to normal seasonal factors (rainfall, temperature, harvest time) and occasional sales (i.e., a pig, cow, etc.).
- Income is also affected by unpredictable factors such as random variation in weather (floods, drought, etc.) or in market prices that tend to fluctuate according to local and non-local conditions. These unexpected climate- or market-driven factors could be large, causing measurable changes in income over time.
- Prices are likely to be different across localities and across time. Therefore, a higher income in a neighboring region could only mean that prices are higher there. Also, inflation can cause changes in household income. These issues cause problems with interpretation of differences in household income across communities or over time.
- Lastly, measurement of changes in household income do not take into consideration other factors related to income such as purchasing power, savings, access to formal or informal credit markets, access to resources from other family members or from non-family social networks.

18 PERCENT OF HOUSEHOLDS THAT EARN INCOME FROM NEW OR ALTERNATIVE INCOME-GENERATING ACTIVITIES

LEVEL OF MEASUREMENT: Outcome.

DEFINITION: This indicator measures the ability and willingness of communities to adopt new income generation activities taught by the project and whether the new livelihood activity has been successful in earning income for the household. Earned income could be an increase over time from the new activity or a one-time earning event based on a new income-generating activity.

Calculation

$$\frac{\text{\# of households that earn income from a new or alternative activity that either was not practiced the previous year or that the project introduced}}{\text{total \# of households in the same area earning any income}} \times 100$$

DISAGGREGATE: Type of income-generating activity.

PURPOSE: Diversification leads to capital asset accumulation, reduced economic vulnerability, and promotes flexibility, resilience, and financial stability. Linking this indicator to the number of educational sessions provided and disaggregating by type of livelihood introduced can help demonstrate the project's success. While educational sessions may be provided to one member of a household, the entire household benefits from the increase or reliability of income and/or from the addition of a new wage-earner.

DATA SOURCES: Population-based survey or project-records.

TIME FRAME: Every two to five years or after a one-time event.

DATA COLLECTION CONSIDERATIONS: Surveys can be used to ask about previous and current income-generating activities. Project records can also be used to assess the changes in household income from a new or alternative income source. Whether or not people adopt new income-generating activities depends not just on the educational sessions and inputs they received but also depends on their time and resource constraints, infrastructure limitations, and cultural values. A breakdown by age and gender of the household members included in the activity would be useful.

STRENGTHS & LIMITATIONS: This indicator is a measure of the outcome of the project's efforts to introduce new, alternative and more sustainable livelihoods into the target community. However, this indicator measures only "yes/no" responses for whether a household is earning income from any new livelihood practice not used the previous year. This indicator does not account for long-term use practices, such as whether a household continues to use the new practice over time. It is also not necessarily the case that the new activity is better for the environment than the old activity or in regard to how much money the household earns.

Glossary

ACTIVITY — An activity is any specific action or event implemented to reach a target audience. Activities are what programs or projects use to produce outputs from inputs and ultimately achieve their objectives. Activities should be linked, focused, feasible, and appropriate. A given activity, when frequently repeated, can become an intervention or strategy.

BIAS — Bias is a systematic flaw in the collection or analysis of data that makes recorded results differ from actual results. Bias can be created accidentally or deliberately.

CONCEPTUAL FRAMEWORK — A conceptual framework is a diagram that shows the relationships between important elements of a program, including inputs, processes, outputs, outcomes, and impacts.

DATA — Data are raw facts, observations, or numbers collected through M&E; for example, the responses to an individual survey, or the number of vaccinations recorded in health survey records. Data that have been analyzed or processed to be useful for program or project efforts are referred to as information.

EVALUATION — Evaluation is the systematic application of quantitative or qualitative research techniques to determine the appropriateness and effectiveness of the design and implementation of a program. Evaluations determine whether programs are achieving their stated objectives and, ultimately, making a difference.

GOAL — A goal is a broad, long-term improvement or change that a program or project intends to make. Goals should be wider in scope than objectives.

IMPACT — Impacts are the ultimate results or improvements that projects or programs attempt to achieve, such as a reduction in HIV/AIDS incidence or an increased life expectancy. These can also be referred to as long-term outcomes.

INDICATOR — An indicator is a variable that measures one aspect of a program, project, or a specific population, health, or environmental outcome. Indicators should describe a specific behavior, concept, or phenomenon. To provide effective M&E, a program or project should have enough indicators to measure every important aspect of the program or project.

INPUT — Inputs are resources used or designated for a project or program. Input is the term used in the initial level of measurement along a logical continuum in achieving project or program results.

INTERVENTION — An intervention is a group of related activities and procedures intended to address a specific identified problem.

LOGIC MODEL — A logic model is a systematic, visual way to present the underlying assumptions and theoretical framework of a planned program. It is a picture of why and how you believe a program will work. Typically, the process is represented in five steps: inputs, processes, outputs, outcomes, and impact.

MONITORING — Monitoring is a process used to make sure that a program or project is being implemented in the way that was intended. Monitoring involves routinely gathering and recording information on how a program or project is being implemented.

OBJECTIVE — An objective is a desired result of a project or program that contributes to the achievement of goals. Objectives should be specific, measurable, attainable, relevant, and time-bound.

OUTCOME — Outcomes are the changes to the population, environment, or health-system that result from a program or project, such as the percent of pregnant women vaccinated.

OUTPUT — Outputs are the services or materials that project or program activities produce, such as the number of trees planted or iron supplements distributed.

POPULATION-BASED SURVEY — A population-based survey is a standardized, quantitative method of data collection. Formal surveys collect data on samples of individuals or groups of people who have been randomly chosen and identified.

PROCESS — Process is the procedure that a project or program uses to achieve results and refers to the operational level of measurement in achieving outputs and outcomes.

PROGRAM — A program is a combination of interventions or activities that an organization establishes as a fundamental part of its structure and mis-

sion. Organizations develop programs consistent with their missions and policies. A program may consist of several different projects.

PROJECT — A project is a combination of interventions or activities that an organization has established in response to specific circumstances or needs. Projects tend to have a definitive start and end date.

QUALITATIVE TECHNIQUES — Qualitative techniques tend to answer “how” or “why” questions. Common qualitative techniques for M&E include focus groups, in-depth interviews, and observation.

QUANTITATIVE TECHNIQUES — Quantitative techniques tend to answer “how much” or “how many” questions. Structured interviews and service statistics are two common quantitative techniques for M&E.

RESULTS FRAMEWORK — A results framework is a diagram of program performance that begins with a program goal, which leads to multiple strategic objectives, which in turn lead to outcomes, and ultimately to impacts. Each step in a results framework should have one or more specific indicators to measure that step’s progress or status.

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