CHAPTER 5
BENEFIT-COST PROGRAM: GUIDANCE

Introduction

The accuracy, validity, and usefulness of any benefit-cost analysis depends on the correctness of the input data. Any benefit-cost analysis in which input data such as the building depth-damage function or the effectiveness of the mitigation measure do not realistically reflect the particulars of the building and mitigation project under evaluation cannot provide useful results.

The computer software truism

"GARBAGE IN, GARBAGE OUT"

applies to benefit-cost analysis of hazard mitigation projects.

Each analyst conducting benefit-cost analysis has the responsibility to ensure that all data inputs are reasonable, defensible, and well-documented. The program processes all of the data inputs in a mathematically correct manner, but **the program cannot produce correct results when incorrect data are entered**. The analyst has control over the data inputs and thus responsibility for the results.

Thus, a good faith effort must be made to obtain accurate input data for benefit-cost analysis. The **Zero Flood Depth Elevation** of the building under evaluation is particularly important because this markedly affects the degree of flood risk to the building and thus markedly affects the benefits of avoiding future flood damages.

Each benefit-cost analysis must be reviewed to ensure that the data inputs are accurate and applicable to the building under evaluation.

Exact Data vs. Estimates

Despite the importance of accurate data input for benefit-cost analysis, very few of the data inputs for benefit-cost analysis of hazard mitigation projects will be exact numbers. However, if exact numbers are available for some of the data inputs, enter them. For example, if the zero flood depth elevation, the building square footage and the value of contents are known, then enter the known values. In most cases, however, only a few of the required data inputs will be known exactly.

Typically, most of the data inputs for benefit-cost analysis will be estimates, rather than exact numbers. If exact values are not available, it is acceptable to use approximate values or your best judgement. For example, if a neighborhood has houses of approximately 1000 square feet and an average value of $60,000, then it is acceptable to use these values as the average for the neighborhood. It is **not** necessary to determine that one house is 927 square feet and another 1083 square feet, or that one house is worth $56,000 because the roof leaks and another is worth $62,500 because it has an elegant fireplace in the living room.

For most small projects, approximate values may provide an acceptable benefit-cost analysis. As project size (i.e., cost) increases, or for projects whose benefit-cost ratio is very close to one, it may be worthwhile to devote more time and effort to obtaining better estimates or more exact values.

If exact data are not available, it is quite acceptable to use approximate data, reasonable estimates, or informed judgements.

Data Requirements

The level of detail, amount of data required, and level of effort necessary to conduct a benefit-cost analysis of a hazard mitigation project may vary substantially depending on the scale of the project and the desired accuracy of the analysis.

The benefit-cost software is flexible and is designed to accommodate different levels of analysis corresponding to different scales of projects and desired level of accuracy. The simplest analysis, requiring the least project-specific data, can be completed using "default" or reference data built into the program, along with a minimum amount of required project-specific data. More detailed analyses can, if desired, incorporate a large body of project-specific data.

LEVEL ONE (Minimum Data) B-C Analysis

A **LEVEL ONE (Minimum Data)** benefit-cost analysis can be conducted using "default" or reference data built into the program. See **Chapter 6, Benefit-Cost Program: Level One Analysis** for more detailed information.

The LEVEL ONE Data entries MUST be completed whether or not a LEVEL TWO analysis is subsequently conducted.

A LEVEL ONE (Minimum Data) analysis may be appropriate for small, low-cost projects or as an initial screening of larger projects to assess whether more detailed analysis is warranted.

A LEVEL ONE analysis is appropriate only if flood damages are due predominantly to water depth and not to high velocity flow, debris or ice impacts, erosion, or soil failure.

A **LEVEL ONE (Minimum Data)** analysis relies heavily on default data built into the Benefit-Cost Program. Completing a **LEVEL ONE** benefit-cost analysis requires entering the following information:

1. All "required" data on the **LEVEL ONE Data** screens, which include:

   a. **Project Information**. These data, discussed in Chapter 6, page 6-3, identify the facility, the project under evaluation, and the discount rate. Except for the discount rate, these entries do not directly affect the numerical benefit-cost results.

   Specification of the discount rate is discussed in **Chapter 6, Benefit-Cost Program: Level One Analysis**. The discount rate is fixed by the Office of Management and Budget (OMB) and FEMA policy and is **NOT** a user-adjustable data variable for FEMA-funded projects. This entry should be checked for appropriateness. The appropriate rate for Section 404 or 406 Hazard mitigation projects is defined by OMB and updated annually.

b. **Building Data**. These data, which are discussed in Chapter 6, page 6-5, contain essential information, including the zero flood depth of the building, and building replacement value.

c. **Building Contents**. These data, which are discussed in Chapter 6, page 6-9, identify the contents and the contents value.

d. **Displacement Costs Due to Flood Damage**. These data, which are discussed in Chapter 6, page 6-10, identify the cost of temporary building space and other costs associated with displacement from the building due to flood damage.

e. **Value of Public/Nonprofit Services**. These data, which are discussed in Chapter 6, page 6-11, describe the type of services provided, the daily cost of providing these services from this building, the post-disaster continuity premium, and the total value of lost services per day.

f. **Rent & Business Income**. These data, which are discussed in Chapter 6, page 6-14, identify the total monthly rental income and estimated net business income of commercial tenants (if any).

g. **Mitigation Project Data**. These data, which are discussed in Chapter 6, page 6-14, specify the type of mitigation project, lifetime of the project, the total costs, and the effectiveness of the project in avoiding future damages and losses.

2. **Flood Hazard Data** on the "Flood Hazard" data entry screen. The required data on the "Flood Hazard" screen, discussed in Chapter 7, consist of information from the Flood Insurance Study (FIS): flood elevations and discharges for 10-, 50-, 100-, and 500- year floods. If a FIS is not available, then comparable data may be obtained elsewhere or estimated. In any case, good estimates of the flood hazard at the site under evaluation are essential for benefit-cost analysis.

To conduct a LEVEL ONE (Minimum Data) benefit-cost analysis:
1) fill in required LEVEL ONE Data, and
2) fill in Flood Hazard Data.