

Appendix C: Economic Analysis of Natural Hazard Mitigation Projects

Authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the Hazard Mitigation Grant Program provides grants to state and local governments to implement long-term hazard mitigation measures. A key component of developing long-term strategies is conducting a benefit/cost analysis for natural hazard mitigation projects. This appendix describes the importance of implementing mitigation strategies, different approaches to economic analysis, and methods to calculate costs and benefits.

This appendix is intended to provide a general overview of benefit/cost analysis and how it can be used to evaluate local hazard mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries and the potential for loss of life which otherwise may occur. Evaluating mitigation strategies through cost/benefit activities enables decision-makers to compare alternative projects and make sound decisions with the resources available.

Evaluating mitigation projects is a difficult undertaking influenced by many different variables. First, natural hazards affect all segments of the communities they strike, including individuals, businesses and public services such as fire, police, utilities and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce “ripple-effects” throughout the community, greatly increasing the disaster’s social and economic consequences.

From a public policy perspective, there is a value in assessing the positive and negative impacts from mitigation activities. An instructive cost/benefit comparison provides a better understanding of how or when various mitigation options should be pursued.

Economic Analysis Approaches

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies falls into two general categories: benefit/cost analysis and cost-effectiveness analysis. The two methods are distinguished by the way in which the relative costs and benefits are measured. Additionally, there are varying approaches to assessing the value of mitigation for public sector and private sector activities.

Benefit/Cost Analysis

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting a benefit/cost analysis assists communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later.

In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. If the net benefits exceed the net costs, the project would be considered worth pursuing.

Cost-Effectiveness Analysis

Cost-effectiveness analysis involves how best to spend a given amount of money to achieve a specific goal. The main difference with this type of analysis is that costs and benefits are not necessarily measured in terms of dollars.

Determining the economic feasibility of mitigating natural hazards impacts those who have an economic interest in the outcome of the activity. This includes the public and private sectors.

Public Sector Mitigation Activities

Mitigation strategies in the public sector become complicated because it involves estimating all of the economic benefits and costs to a large number of people and entities (i.e. the public).

Private Sector Mitigation Activities

Private sector mitigation projects generally occur in one of two ways. (1) it is mandated by a law, regulation or standard, or (2) it is economically justified on its own merits. A building or landowner required to conform to a mandated standard may consider the following options:

- 1) Request cost-sharing from public agencies;
- 2) Dispose of the building or land either by sale or demolition;
- 3) Change the designated use of the building or land; or
- 4) Evaluate the most feasible alternatives and initiate the most cost-effective hazard mitigation alternative.

The sale of land or buildings can create another set of concerns. Ohio real estate disclosure laws require owners to disclose known defects and deficiencies to the property. These deficiencies can impact the purchase price, or even the ability to sell, property.

Conducting an Economic Analysis

1. Identify Alternatives

Alternatives for reducing risk from natural hazards can include structural projects to enhance disaster resistance, public education and outreach and acquisition or demolition of vulnerable properties. Mitigation projects can vary in size, scope and cost.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to calculating costs and benefits of mitigation projects. Potential economic criteria include determining the project cost and estimating economic and non-economic (i.e. human, environmental) benefits from the project.

3. Analyze and Rank Alternatives

Once economic costs and benefits have been quantified, projects can be ranked based on other factors including risk, environment and social returns.

Economic Returns of Mitigation Projects

A complete understanding of development trends and the local economy is a key factor in evaluating the economic feasibility of mitigation actions. Losses to business and inventories could be substantially higher than individual homeowners. Also, decision-makers should understand the total economic impacts of natural disasters in order to calculate the benefits of mitigation activities.

Benefit/cost analysis is complicated, and it is essential to consider a number of factors when making project recommendations. Many communities are working towards developing multi-objective projects. This includes incorporating mitigation strategies into related projects including watershed management, environmental planning, economic development and small business development. Leadership regarding natural hazard planning in to ongoing and new developments increases the viability of mitigation strategies in future projects.