



# Chapter VI: Assessing the Economic Impacts of a Major Disaster

## Overview

Major disasters almost immediately elicit questions about severity. Inquiries from different levels of government, the private sector, the media, and the public as a whole will inundate the affected area. In the US, there are many impact assessments that are conducted as a standard practice. These assessments determine eligibility for state or federal disaster declarations, inform local decision-making processes, and evaluate the severity of impacts to specific sectors (e.g. critical infrastructure, impacts to structures, housing, local government functions). It is critical that EDOs and economic development professionals play an active role in these processes. While the conduct of these (relatively) routine assessments follow well-defined paths, there tend to be very few, consistent efforts to evaluate the disaster's impact on the business or economic sector.

This may seem to contradict the evaluation of past disasters in terms of dollar value impacts, as these would suggest there was an economic impact valuation of the disaster. The National Oceanographic and Atmospheric Administration (NOAA) maintains the National Climate Data Center which collects, assesses, and evaluates many forms of weather incidents and their impacts. They also evaluate the economic loss estimates from those incidents. However, the outcome of those assessments will typically represent a "total loss" value. This is where the evaluation of a specific disaster as "a billion dollar" disaster comes from. From an economic recovery perspective, that value provides very little actionable information. For example, there is no routine evaluation of industry-level impacts, changes in investment risk, local market conditions, workforce dynamics, or other topics that may yield more specific actions from economic development professionals.

For this reason, among others, it is imperative that the EDO play a supportive and even leading role in initiating more detailed impact assessments after a major disaster. Ultimately, it provides a solid and basic understanding of how to improve the situation, and help engage the community in problem solving efforts. Detailed assessments of impacts to the business environment provide direction for the most appropriate responses and recovery efforts to pursue as well how the community might want to consider mitigation efforts for future events.

There are many different types, methods, and applications of conducting economic impact studies. It is critical that EDOs and local officials set forward a clear expectation of what the study is intended to achieve as it applies



to the current and anticipated needs. The table below summarizes many of the significant types of studies and their corresponding role in the recovery process. Naturally, this information is intended to convey broad ranges of assessments and there exists ample room for adapting and customizing these and other elements to meet specific post-disaster needs.

The economic damage of a disaster goes beyond accounting for physical damages or insured loss to such measures as the indirect costs of business interruption caused by power failure or market loss. This kind of understanding can help to shape initiatives to restore the local economy and prevent further catastrophes.

This chapter provides insight into the types, applications, and components of a post-disaster economic impact study, how to develop the study, and other useful advice when implementing the assessment process.

### Types of Economic Impact Studies

Type of Assessment	Issue(s) Addressed	Typically Conducted by	Geographic Scope	Target Audience
<b>Market study</b>	Uncertainty of how the local market conditions may have changed	EDO, higher ed, consultant	Local	Business community
<b>Economic impact assessment/analysis</b>	Uncertainty of the full scope and economic consequences. Concerns about projecting tax revenue losses. Lack of economic data about impacted areas.	Higher ed, consultant, government	Local, regional, state	Local/state government
<b>Industry impact assessment/analysis</b>	Concern about acute impacts to a specific industry, which determines how and to what extent to assess	EDO, consultant, trade group/association	Local, regional, state	Business community, EDOs
<b>Workforce assessment/analysis</b>	Did incident create skills gap/surplus? Retraining opportunities? Impact on unemployment.	Higher ed, workforce agency, consultant	Local, regional, state	Local/state government, higher ed
<b>Resilience analysis</b>	What actions can be taken to mitigate future impacts?	EDO, local/state government	Local, regional, state	Local/state/federal government, private sector



Type of Assessment	Issue(s) Addressed	Typically Conducted by	Geographic Scope	Target Audience
<b>Small business impact analysis</b>	What impacts happened/will likely happen to small businesses? Changes to small business outlook?	EDO, SBDC, local/state government, higher ed	Local	Local/state government, EDO
<b>Economic development assessment</b>	Has the incident changed perception of the investment risk? What impacts happened to economic development efforts/programs?	EDO, government, consultant	Local, regional	Local government, EDO
<b>Cluster or entrepreneurship analysis</b>	Has there been any impact on existing or nascent clusters? Are there any “clusters of opportunity” that could be prioritized for recovery? Is there an impact (positive or negative) on business churn or innovation?	EDO, higher ed, local government, consultant	Regional, state	EDO, state government, higher ed

The variety of types and applications of impact assessments necessitates that the EDO inform those they serve about how to best reach their intended goals. Without a clearly defined “so what” objective to the assessment, the effort could become overly academic. The EDO and other stakeholders considering the need should carefully consider questions like:

- If we conduct this assessment, what will be the deliverable?
- How will that deliverable be used?
- How will the assessment support our recovery decision-making and planning?
- How will the assessment make our economy more resilient?
- How will the assessment help allocate resources, funding, and program assistance to the areas/sectors of greatest need?

### Defining a Post-disaster Economic Impact Study

Most post-disaster economic impact studies document the impacts using economic indicators such as physical property, business and industrial activity, tax revenues, the loss of business income, and other damages to the local economy. Other indicators that can be critical to gather are the qualitative “issues” that emerge after an incident. Often the presence of an issue or perception of an issue can provide invaluable direction to inform future recovery efforts. Studies may vary in scope, depending on the type of disaster, time considerations, and the amount of resources available to conduct them. All of these studies attach measurable figures to the damages incurred to a given area after a disaster.



Since the “true” measure of an economy is often not satisfactorily measured by a single value, the economic impact study or assessment should seek to provide a measure from analysis and interpretation of an aggregate of indicators. By documenting changes in a range of economic indicators, these studies provide an outlook on how local economies can expect to fare after a disaster strikes. They can also reveal the extent of a community’s needs for external resources for response and recovery assistance.

Post-disaster impact studies can take anywhere from several weeks to months to complete, depending on the scope of the analysis and the availability of the data. In cases of immediate need, communities have been able to retrieve basic information in a matter of a few days when the local government must provide a cost figure for the purposes of securing aid. This initial assessment should be consistent with the expectations of those impacted locally to make sure that the community isn’t grossly underestimating or overestimating the damages. It should be noted that there are clear and rather significant obstacles in constructing one accurate overall figure for a disaster’s impact, particularly immediately following an event where the supporting data is absent and/or sparse. Further, for many communities coming up with a singular loss figure is generally useless since it reflects losses borne by the economy as a whole and doesn’t consider subtler spatial or industry trends (which could lead to more actionable information).

In interviews with impacted communities and consultants who perform this type of analysis, it was recommended that preliminary figures should be followed up by a more thorough economic impact studies approximately six months to a year after the event. This additional study should allow for more realistic analysis of damages, particularly since federal data and figures may take three to six months to be updated following a crisis (since they typically follow their regular update cycle regardless of the incident). A common challenge for small and medium-sized communities is finding sufficient financial resources to conduct a thorough study. Communities may or may not have the required capacity to do the study internally. In either case, the variability of cost and capacity to undertake these studies emphasizes the need for their execution to be clearly targeted on meeting a direct need or specific objective.

### **Distinguishing a Post-disaster-driven Study from an Economic Development-driven “Traditional” Economic Impact Assessment**

A traditional economic impact analysis examines a proposed policy or economic development project to determine how it will impact the local economy in terms of changes in the level of economic activity. This typically involves measuring growth opportunities such as increased output, business or industry revenue, employment, wages, and tax revenues. These studies are used to gather public support for the proposed project by determining if the community is better off. The study highlights the net benefits to the community. Depending on the study’s methodology, there is an evaluation of the direct, indirect, and induced impacts of the proposed economic development project or policy.



Traditional economic impact studies are often narrow in scope. For example, they may be evaluating a proposed real estate development project or a new city policy. They are often designed to show how the local economy is boosted by a project or policy under consideration.

Post-disaster economic impact studies, in comparison, measure how the community has been adversely affected by a major incident. For example, this can include business interruption due to the closure of a port, the shutdown of a major bridge or road, or a natural disaster that disrupts the entire community or region.

Determining the economic impact of the disaster can vary greatly based on:

- the magnitude of the disaster and the ability to measure all of its impacts,
- challenges with limited data,
- organizational capacity within the community to gather needed impact information, and
- varying methodologies that can measure the disaster's economic impact on business and the local economy.

Economic impacts of disasters are more difficult to assess because many things have happened at the same time that affect the larger economy after a disaster. For instance, a major storm can inflict wide-scale damage to supply chains and infrastructure, rather than the more narrow impacts likely from a local development project such as the attraction of a new firm or the construction of a shopping center. "Traditional" impact studies rely on simple models due to their limited scope, while post-disaster economic impact studies require more sophisticated economic models to assess damage. Often these models depend on a high degree specificity of post-incident impact data to fuel the methodology or establish critical assumptions. Some examples of that specificity include things like; industry classifications for impacted firms, duration of business disruption, and percentage of diminished output over time.

## The Purpose of Post-Disaster Economic Impact Studies

A post-disaster economic impact study provides insight to public officials, business leadership, and local industry in how the community has been damaged and helps inform their future decision making in terms of response, recovery, and mitigation. The study serves various functions for different stakeholders.

### Public officials are assisted by:

- Developing a clear picture of how industry and business has been impacted by the disaster;
- Receiving information on economic impacts to share with state and federal officials in order to justify the need for external recovery resources;
- Being informed in a way that influences decision-making in a time of crisis and taking critical actions for short- and long-term recovery;
- Understanding how current and future tax revenues have been negatively impacted by the event and how public services might be affected;
- Understanding how to hold organizations accountable in the event of a man-made disaster (for example, how British Petroleum was required to assist in rebuilding efforts after Deepwater Horizon Oil Spill);



Economic Development Organizations, Chambers of Commerce, and Business Councils are assisted by:

- Developing an outlook of how the local economy has been impacted by the event;
- Understanding how employment, wages, and tax revenues have been adversely affected;
- Providing support for identifying strategies, programs, and projects for short- and long-term recovery;
- Educating community stakeholders on the current situation to provide insight and build consensus on how the community should move forward.

Local businesses are assisted by:

- Knowing the current market situation for business planning purposes;
- Understanding how labor markets and supply chains have been impacted;
- Understanding how various sectors have been impacted.

## Challenges in Conducting a Study

It is important to be aware of the possible obstacles that may arise when conducting a study in a post-disaster environment. The following are issues that other disaster-impacted communities have faced:

- The quality and availability of data may be limited;
- Collecting data and information from businesses may be difficult due to disrupted communication channels;
- Local EDOs may not have the organizational resources to manage a large project such as this while also recovering from disaster;
- Impacted businesses may be reluctant to share damage information;
- Topics to cover in the study and how to fund it may appear daunting.

### HAZUS

A software program available for download online, HAZUS is FEMA's methodology for estimating losses from earthquakes, floods, and hurricanes. The program combines scientific and engineering expertise with geographic information systems technology to help users visualize the impacts it models, and can be used for both pre-disaster risk assessment and post-disaster economic impact. Among the indicators it measures are physical damage, economic loss, and social impacts.

HAZUS is not related to Preliminary Disaster Assessments, but is a tool to be used by anyone. It is available free at <http://www.fema.gov/hazus>.

### Data Availability and Reliability

The final result of the economic impact study is a mark of the quality of information and data that is input into the model. Typically, there is a delay between the time that data can be collected in a post-disaster environment and when it is made publicly available. Federal sources of data may take six months to be updated – depending on the magnitude of the disaster. Relying on dated U.S. Census information or other federal sources is likely to be insufficient in order to get an accurate picture of population or jobs in the aftermath of an event. In the case of information gaps or unreliable figures, realistic assumptions should be employed at first. When the data becomes available, the model should be updated to reflect the more realistic numbers.

However, data availability (or the lack thereof), should not be a roadblock for conducting *some* kind of economic impact study. If the study is clearly defined to meet a clear need of the recovery effort, the analyst should



consider conducting a broader qualitative assessment as well. Often convening “economic recovery roundtable” meetings with a diverse pool of stakeholders can be pivotal to solicit locally-driven impact information. While much of that data will be unverified and won’t contribute to an empirical figure about the impacts, it can give the analyst a critical insight into the issues and requirements being faced by the community. These insights can then translate to further investigation for key topics and yield previously unknown data sources.

### Overcoming the Challenges of Calculating Tax Revenue Loss

Though tax revenue data is technically public information, it is not always readily available. For state-level data, legislative fiscal offices often maintain time series on tax collections. Comptrollers or assessor’s offices should have property tax data. On a local level, individuals who control access to this information vary, but could include finance officers, clerks, economic development officials working for the government, and elected representatives.

At times, state taxes may not be able to broken down by area. If this is the case, you will need to determine whether your state has a government agency or private corporation that provides information retrieval services down to the local level.

A fact to bear in mind is that even when tax data is available, some local governments may not have the full capacity to collect taxes in the wake of a disaster - more a matter of logistics than actual economic losses. Looking at tax revenues can be a limited means of measuring a disaster’s impact on certain industries; changes in sales taxes and revenues account for retail gaps, but not other industries like manufacturing.

### Communicating with Stakeholders

After disasters strike, certain modes of telecommunications such as phone lines, the internet, email, and postal services may be shut down for a significant period of time. When this happens, businesses may not respond as they normally might to an electronic survey.

Potential solutions to communication issues include:

- Employing a texting campaign if you can access the cell phone numbers of local business owners or managers;
- Advertising in print, radio, television or through social media;
- Holding public meetings with businesses and/or in partnership with other chambers and EDOs that have a network of local business contacts;
- Conducting a grassroots communications campaign through personal visits or hand delivering a paper survey;
- Arranging for the collection of information at a centralized location, such as a business recovery center.

Communicating with stakeholders in the event of a major disaster is a vital component in any community’s ability to be resilient and recover from an event. It is recommended that EDOs and chambers develop a



communications plan *before* a disaster to be implemented in the case of a disaster. For more information, see Disaster Preparedness, chapter III in this toolkit.

### Funding a Study

The ability to pay for an economic impact study can also be a concern when funds are extremely limited following a disaster. Local governments, nonprofits, and educational institutions can seek funding from external sources such as state or federal grants. The Economic Development Administration (EDA), for instance, offers planning grants through its Economic Adjustment Assistance program. HUD's CDBG-DR funds can also fund a study if the disaster has been presidentially declared.

A local community can also reach out to nearby colleges or universities to provide services at discounted prices, which also offer opportunities for faculty and/or students to provide skills.

Additionally, if a local organization can demonstrate that there is a gap in the data needed for its assessment and primary research is required in order to fill the void, then it can also seek funding/assistance from foundations.

### Expanding Organizational Capacity

Staffing is sometimes an issue for localities seeking an impact study. Response efforts to a major disaster can be taxing on available resources as it is, and the coordinating authority behind the study may not have the capabilities required to carry out a study. Staffing also plays a role in how broad an outreach effort can be orchestrated, particularly when conducting surveys. When possible, seek the assistance of volunteers and nonprofit groups to help in these efforts.

At a minimum, many EDOs should maintain a “surveillance” capacity to monitor for economic recovery issues and barriers to then communicate those issues to local officials, state and federal agencies, and non-profits.

Another approach is to build information collection into existing recovery efforts. For example, EDOs can disseminate an outreach survey at a business recovery center. Such a survey can gather intelligence on how the local businesses have been impacted economically by the disaster, and determine what programs or information they need in the short and long term. After flooding in Milwaukee in 2008, a group from the University of Wisconsin – Milwaukee conducted a local business impact assessment survey in the Milwaukee metro area to better understand impact using such a study. This can be found in [Resources Appendix 11](#).

## Timing the Analysis Process

As mentioned previously, certain communication channels can be severely hampered in the immediate aftermath of a disaster. Additionally, professionals often acknowledge that there is a “Timing-Accuracy



Continuum,” where the sense of urgency behind completing a study must be balanced with the fact that as time passes, certain data becomes more accurate and complete.

### Effects on Data Collection

When telecommunications and the internet are impacted for a significant period of time, the response rates for business surveys are likely to be impacted. As a result, impact studies conducted directly after a disaster might provide business impact estimates that will need to be adjusted. Among the reasons for this is the fact that it may remain unclear as to whether certain business owners have left, are still evaluating their prospects in the wake of the disaster or negotiating with insurance companies, or simply could not be contacted. Conducting business surveys can be time consuming, and the process of realistically collecting data should be contemplated in light of communication obstacles.

There is a lag between when certain sources collect data and when they report it, such as employment and tax information. It is difficult to separate short-term from long-term impacts without allowing some time to pass. Some studies may over-estimate or under-estimate economic impact when they are compiled too hastily and as a result may not be acceptable to publish. Additionally, some long-term figures are useful to know, such as population trends, but might not be available for some period of time. Groups requesting and/or conducting impact studies should consider either allowing for a delay before beginning a study, or conducting an initial report with a series of updates as more information becomes available.

Given these challenges, it may be most efficient (and accurate) to let at least one to two months to pass before commissioning a study – despite the fact that many disasters call for an immediate response when communities are seeking government aid. While it is a general rule of thumb that the longer the waiting period, the more accurate the data will be, leaders must balance the availability of good data with the exigency of the particular situations they face.

## The Process of Conducting Post-disaster Economic Impact Studies

There are several steps to the process of carrying out a post-disaster economic impact study. First, it must be determined who will coordinate the study, what roles other groups will play in the process, and how the study will be funded. From there, the geographic scope must be identified, and the questions that the study ought to answer must be determined (including the inputs going into the study). It is recommended that the analytical model be customized based on local characteristics. In addition, the results should be reviewed and scrutinized to ensure that final results are accurate. The following section will assist in ensuring this process is properly planned and executed.



## Step 1: Defining the Geographic Area

The geographic scope can vary greatly for an economic impact study, and it is typical for the party requesting the study to be the one that specifies the boundaries of the economic area that is to be analyzed. As such, it is important for individuals requesting a study to know what they are looking to get out of the study. Part of what will determine the area of analysis is the type of disaster that strikes and the kind of group for which the study will be conducted. For instance, a study on the impact of the Gulf Oil Spill requested by the Louisiana shrimp industry would likely have a different scope than a study on the economic impact of Hurricane Gustav conducted by the Louisiana state agency for economic development.

In the event no specific geographic area is indicated, analysts will determine the boundaries based on the areas experiencing direct damage from a disaster. The party conducting the study should gather as much data as available regarding impacted industries, then cross reference with geographic information to determine an appropriate area for study. This may result in the investigation of a specific region within a state, or developing a tailor-made analysis area that may cross regional or state borders. In interviewing a number of experts on conducting these post-disaster impact studies, IEDC gathered the following factors to consider in determining the economic area:

**Cross boundaries.** The area impacted may not be centered around a single metro area but between several metro areas with economic interconnections.

**Consider impacts.** The epicenter of destruction is not always the center of regional commercial activity.

**Interdependence is inevitable.** It is often advisable to broaden the scope to an area beyond the borders of direct physical damage, because of the regional economic interdependence. A broader area of scope also helps differentiate between resident and job transfers from one county to a bordering county within the region and transfers from inside the region to outside the region.

**Different types of disasters call for different geographic scopes.** In the case of a hurricane, one may observe rings around the immediate area along the coast, around the areas that are ten miles inland, and around an additional 100 miles where evacuees may relocate. Such an approach may not be appropriate for other types of disasters.

**Non-declared disaster does not mean non-impacted.** Federal funds will be limited to eligible counties that are declared disaster areas, even though the damage may cover a broader geographic region than just eligible counties.

## Step 2: Selecting Indicators to Measure

There are three levels of analysis a study should consider: direct impact, indirect impact, and induced impact. The level of analysis, as well as the number of industries, must be determined in order to select accurate indicators for a study. This may vary depending on the nature of the disaster. A hurricane, for instance, is a



large-scale event that will likely impact both property and a broad range of industries. An oil spill, on the other hand, will induce limited inland property damage and is likely to be tied to the energy, fishing, and tourism industries more than other sectors.

### Common Indicators

Among the common indicators included in impact studies are<sup>21</sup>:

- Tax revenue loss (e.g., sales, property, employment, etc.)
- Change in employment by industry
- Loss of wages
- Business interruption (e.g. change in gross product, output shifts)
- Loss of revenue for key industries within the impacted area
- Business relocation and business closures
- Damage to infrastructure (e.g., sewers, transportation networks, intermodal facilities, etc.)
- Damage to property (e.g., commercial, industrial, and residential land, structures, and equipment)
- Damage to the environment and natural resources (e.g., damaged water supply, crops, beaches)
- Insured vs. uninsured losses
- Expenditures and/or participation in recovery or assistance programs
- Visitor data to key landmarks
- Changes in utility receipts/output
- Survey data
- Spatial impact data

### Other Indicators

Additional indicators might also be included in more in-depth studies, such as:

- Capacity losses in nursing homes, hospitals, and intermediate care facilities
- Capacity losses in logistics centers (e.g. tonnage capacity in ports)
- Declining enrollment in schools and child care facilities
- Tourism decline and loss of hotel revenue
- Tax delinquency (e.g. on damaged property, property taxes, sales tax, and royalties)
- Trends in the number of building/housing permits issued before and after the disaster
- Shifts in insurance rates
- Qualitative recovery issues

## Step 3: Collecting Data

### Public Resources

Government agencies dedicated to collecting data are generally viewed as reliable sources. Professionals often look to federal data first, as the reliability of data generally increases as the level of data becomes broader.<sup>22</sup> Generally speaking, the smaller the region observed, the more difficult it tends to be to retrieve accurate figures. Economic impact studies commonly include employment data from the Bureau of Labor Statistics (particularly its Quarterly Census of Employment and Wages), economic modeling information from the Bureau

<sup>21</sup> Interviews (General Consensus)

<sup>22</sup> Rookard, M.( July, 2012). Personal Interview by Carrie Mulcaire and Patrick Terranova.



of Economic Analysis, and other information as may be appropriate from the Census Bureau. Tax revenue data can be gathered from state and/or local governments' revenue departments and taxing agencies.<sup>23</sup>

### Fee-for-service Resources

Consultants, chambers of commerce, business councils, and other economic development organizations may be able to provide data they have collected. It is also possible to contract some data collection out to universities, particularly those with economic research centers.

### Primary Data

Primary data collection can help offset gaps in information not easily retrieved from other sources. Studies often include business surveys to gauge which firms have remained in the area post-disaster, how the disaster impacted their employment levels and revenues, whether they implemented furlough days, what businesses are paying their workers, whether any property was damaged, and the cost of repairs or replacement for damages incurred.

In instances where tourism may be impacted, the assessing entity will likely reach out to hotel owners or hotel associations to assess room vacancies and resulting revenue losses. It may be best for an organization with local ties to be in charge of collecting most primary data, due to the trust factor that comes with familiarity with local residents and businesses. In this regard, organizations such as a local chamber of commerce may be relied upon for primary data collection, and can provide a degree of legitimacy to the figures produced.<sup>24</sup>

Below are some things to keep in mind when undergoing this step in the process<sup>25</sup>:

**Extrapolate from realistic assumptions.** When gaps of information exist or data is not legitimate, make realistic assumptions rather than use unreliable figures.

**Utilize local connections.** There are advantages to having ties to the local area - a trust factor exists in terms of businesses' willingness to answer questions. Also, local EDOs and chambers typically know who within the business is likely to be available to provide data and information. The CEO or business owner is not always the appropriate source to collect needed information.

**Diversify your communication.** While e-mail or text messages can be an effective tool, consider employing other communication methods to reach local business owners.

**Seek partners.** Chambers of commerce and trade associations are generally a good resource for business outreach and can be critical advocates when the area is in disaster mode.

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<sup>23</sup> Interviews (General Consensus)

<sup>24</sup> Ibid.

<sup>25</sup> Ibid



**Tie the disaster impact study to the real world.** Study should be approached not merely as an analysis conducted in a software program, but as a case study too.

## Step 4: Analyzing Data

### Input-Output Analysis

One of the most commonly used techniques for quantifying post-disaster economic impact is input-output analysis. Input-output is a common method of explaining the dynamics at play in a local economy that illustrates how different industry sectors affect each other within a given geographic area. Set up as a matrix, input-output data reports the dollars that each industry puts into, and receives from, other industries. Using this information, impact studies project changes in economic output based on how disasters affect the corresponding inputs.

Among consulting professionals, REMI, IMPLAN, and RIMS II are the most common tools used today. Some university researchers, economic development agencies, and consultants have developed their own models that they use instead of, or in addition to, the models listed above. Their own models have been adjusted to account for the unique factors that arise based on the local and regional economy in which they frequently operate.

It is worth noting that when running the models, the user can extract tax revenue impact data from the overall impact analysis, which some consider to be the most valuable information to come out of the study. Doing so provides the public with information they can relate to and provides a common variable that can be compared to other impact studies. It is also important to note that models will need some adjustments to account for local variations.

Below are some things to keep in mind when undergoing this step in the process:

**Account for false variables.** It can be difficult to differentiate recession characteristics from disaster impacts. If long-time series data is available, observe patterns from previous recessions and trends in order to separate the two within a reasonable margin of error. Another method to account for this is using a dummy variable in a multiple regression model. Otherwise, it may be better to wait until full effects are known and information on when recession subsides is available for certain measures.

**Consider workforce size.** Ensure there is a “sanity check” on data relative to the workforce; make sure plans are underway to ensure the workforce size assumed in the study is accurate.

**Share a draft of findings with industry experts and community partners.** Have your analysis peer-reviewed and vetted by the larger business community, community leaders, and other advisers before going public. This will help to make sure your data links with other data being reported by community partners and ensures requests for aid are comparable and based on similar findings. It also helps to not embarrass publicly politicians that are operating on limited data and information.



**Build seasonal assumptions into the model.** Productivity loss and business interruption can be captured by revenue losses, but make sure to adjust figures seasonally with reasonable assumptions and regard for anticipated information, as well as taking into account seasonal or macro trends indicating a time of recession or growth.

### Analysis Tools

There are several tools available that are used to quantify economic impact:

Tool	Description Benefits/Costs
<p><b>REMI</b> <i>(Regional Economic Models, Inc.)</i></p>	<p><b>Description:</b> A software program that incorporates not only input-output modeling, but also general equilibrium, econometric, and economic geography models.</p> <p><b>Benefits:</b> Provides a comprehensive tool that can project 60-year outlooks. Includes demographic effects, and dynamic effects that occur over a multi-year period. The model is more robust than straight input-output models, and accounts for how the rest of the nation reacts to regional events. The software has a greater level of nuance that can be helpful for complex events like disasters, and comes with unlimited training and technical support.</p> <p><b>Cost:</b> Varies; Rental purchases of data and software cost upwards of \$13,000 for a county/series of counties; Permanent purchases cost upwards of \$30,000 for an entire state plus an annual renewal fee of 15%. (2012 Figures)</p>
<p><b>IMPLAN</b></p>	<p><b>Description:</b> A software program produced by MIG, Inc., with economic data organized as broadly as the national level to as narrowly as the ZIP Code level, which calculates economic impact. IMPLAN uses Social Accounting Matrices (SAMs) to calculate the dollar amounts of business transactions in a region as its measure of economic flow, which are based off regional transaction data that comes directly from businesses and government agencies. Measures direct, indirect, and induced impact.</p> <p><b>Benefits:</b> Allows the user to break down data to the ZIP Code level. Incorporates “non-market” transactions such as taxes and unemployment benefits in addition to trade flows of roughly 500 commodities. Registered users have access to online technical support.</p> <p><b>Cost:</b> Software is free after data purchase; \$350 for a single county file, \$730 for county file delineated by ZIP Code, \$640 for a U.S. or state totals file. Various congressional district, state-level, and national-level data packages are available (prices vary by state). (2012 Figures)</p>



Tool	Description Benefits/Costs
<b>RIMS II</b> <i>(Regional Input-Output Modeling System)</i>	<p><b>Description:</b> Economic multiplier tables produced by the Bureau of Economic Analysis that document the interaction among industries. Utilizing national input-output data that can be regionally adjusted, the multipliers calculate the combined impact of industry output, earnings, employment, and value added caused by changes in demand.</p> <p><b>Benefits:</b> An affordable option. Users can select multipliers organized by region or by industry. Regional multipliers allow the user to define the geographic region. Users have the option of annual series covering 62 aggregated industries or benchmark series covering 62 aggregated industries and 406 detailed industries.</p> <p><b>Cost:</b> \$275 for regional data, \$75 for single-industry data. (2012 figures)</p>

### Spatial Analysis

Often serving as a key input for an input-output analysis, the role of a spatial analysis can have many benefits in its own right. A spatial analysis will utilize a Geographic Information System like ESRI’s ArcGIS to integrate multiple forms of data into a single spatial context. Spatial analyses can be critical to not only identify hot spots of economic impact, but also areas that may or may not be more impacted but their increased vulnerability escalates the consequences of the disaster.

Spatial analyses are often a more rapid method of understanding, describing, and depicting economic impacts. The benefit of rapidity is often enabled by the presence of a pre-disaster GIS capability with an up-to-date dataset about the business community. Included below are some examples of common pre- and post-disaster spatial data sources:

#### Pre-Disaster Data Sources:

**Tax Data.** Depending on the method a local government or state government uses to collect its taxes, location specific information on business establishments may be adaptable to integrate into a GIS. Typically, sales, business, or real estate taxes are good candidates. Others that should be considered (depending on the focus of the impact assessment) are special fees paid, professional licenses, and permits.

**Demographic and Economic Indicators.** The smaller the geographic scope, the more scarce the common economic indicators become. For example, Gross Domestic Product (GDP) is calculated at the national, state, and metropolitan statistical area (MSA) levels but not at the county or lower levels.



**Business Survey Data.** Often the most useful data set is one the EDO maintains on its own. A pre-disaster data set on industry classification, employment size, emergency contact information, and other attributes can provide a valuable baseline of economic impact measurements.

**Commercially Available Data.** There are several firms that provide more granular, business-specific data derived from a multitude of sources not available to the general public without cost. These data sets can be very comprehensive, but must be considered as limited to the assumptions made by the vendor who collected it. A common example of one of these vendors is Dunn & Bradstreet (D&B) who offer a wide range of attribute data up to very small geographic scales.

### Post-Disaster Data Sources:

**Survey Data.** Direct site surveys of damaged areas can be geocoded to be included in other datasets. Additional surveys can capture business impact attribute data which can show trends of recovery issues geographically.

**Remote Sensing Data.** Data collected from aerial surveys or satellites can be analyzed using complex algorithms managed by the federal government. These analyses can compare the visual data of pre-disaster conditions and extrapolate the post-disaster damage based on the updated images.

**Recovery Program Assistance Data.** Program data on the number of applications for certain types of assistance can provide the best available post-disaster business impact indicators (with the exception of direct site surveys) by demonstrating spatial patterns of *demand* for recovery assistance. One example are the statistics about registration in FEMA's Individual Assistance program and loan applications issued by the Small Business Administration (SBA).

### Step 5: Reporting Data

While disaster impact studies can be a useful tool for understanding impacts and seeking funding, they can also be misinterpreted by media or the public. The EDO heading up a disaster impact study has the responsibility to control and frame the information within it, and vouch for the methods used to create it. Since the study is a projection of one or more possible scenarios, EDOs or chambers must use caution and judgment in sharing their findings.

- Be careful that studies aren't quoted and taken as fact. While the media will want numbers before the disaster is over, be aware that information changes over time.
- Be prepared to back up methodology and figures to government officials.
- Use information honestly, with credibility. You will find receptive allies; arm them with an ability to convince skeptics or answer questions. Point out positives of advocated positions, and be straightforward and upfront.



### Case Study: The Economic Impact of the Deepwater Horizon Oil Spill

On April 20, 2010 the Deepwater Horizon oil well burst, leading to a catastrophic oil spill that spread throughout the Gulf Coast. Greater New Orleans (GNO), Inc., a regional economic development organization representing 10 parishes in Louisiana, is among several groups that made efforts to measure the economic impact of the spill. GNO, Inc. conducted a three-part series throughout the year following the disaster that included both quantitative and qualitative analysis revolving around regional economic impact in three areas: fisheries, drilling moratoria, and brand damage.

To project the impact of damage to fisheries, GNO, Inc. used RIMS II multipliers from the Bureau of Economic Analysis. GNO, Inc. created three-year estimates for lost revenues, the number of negatively impacted full-time employees, and loss of output and earnings across the regional economy due to the damage to fisheries. In observing the effects of the drilling moratorium on local businesses, the organization categorized impacted firms into three categories: direct (e.g. oil companies), indirect (e.g. drilling equipment suppliers), and induced (e.g. stores with customer bases that include those from direct and indirect categories). The organization observed the level of wages, tax revenues, and royalties associated in these categories. GNO also looked at indicators without tangible dollar measures, such as the number of new drilling permits granted.

A conversation with a project lead at GNO revealed some useful insight. He emphasized the importance of isolating fiscal impact so that tax revenue can be specifically singled out. Given the variance between different studies, tax revenue can be considered a common variable that stakeholders can relate to.

## Advice on Hiring a Consultant

Because many EDOs have sought to conduct economic impact assessments by outsourcing the requirement to industry consultants, IEDC has developed this section to provide some advice. First, the scope and goals of a project should be determined and be made clear to the consultant. This includes what the scope of geography should be as well as what type of analysis should be conducted. Second, the consultant should seek to work with multiple stakeholders to complete the project.

Cost is often the main concern in determining the selected consultant. However, sometimes a less expensive study can translate into a lack of experience in performing this type of analysis or less scope coverage.

### Determining Goals

Shaping the scope of a request for a study may prove difficult. In this case, consider asking an economist or university researcher with help in developing a request for proposal (RFP) and recommending a methodology. This will not only help determine proper goals for the study, but can also provide a rational basis to follow when deciding between multiple consultants who may have different methods. After a consultant or group of



consultants has been identified, the contracting agency should also review the proposed scope of work(s) and make recommendations before a consultant is determined.

The EDO should also determine, in advance, to what extent *they* will be participating in the assessment process. Questions about setting review milestones, the extent to which the consultant is permitted to independently engage community stakeholders, and the public message about the how and why the study is being conducted are key. Unfortunately, there have been many impact assessment efforts that were derailed because of consultants misrepresenting their client's commitment and inappropriately elevating (or diminishing) local expectations. Others have been so tightly controlled that the consultant was ineffective in reaching a broad enough audience to gather the requisite information. The result was a study that only partly reflected the impacts and can then lose credibility as a decision-making tool.

### Evaluating Your Options

There are several kinds of entities that perform economic impact studies. Given that many local governments or chambers of commerce do not have the capacity or expertise to conduct the necessary analyses in-house; it is a common practice to seek the services of a consulting firm or services from a local university department or center.

The needs for a final product should be balanced with respect to timing, available funding, and the reputation of the potential analyst/consultant. It is important to seek consultants with credibility and experience in conducting these types of post-disaster economic-impact studies.

### The Costs of Conducting a Study

Depending on the scope of the study, an economic impact study can cost anywhere from \$10,000 to \$100,000 up to several hundreds of thousands of dollars for an extensive study. While basic studies can be done for relatively low costs, communities should plan to spend between \$40,000 and \$75,000 if they plan to request a relatively robust study. Much of the cost is associated with the data collection aspect of the project.



### The AUBER Network

AUBER stands for Association for University Business and Economic Research. Since 1947, this group has served as the professional association of businesses and economic research organizations in public and private universities. They work to improve the quality, effectiveness, and application of research in business, economics, and public policy.

According to their website, [www.auber.org](http://www.auber.org), their members engage in a diverse array of applied economic research, with many AUBER member organizations providing their communities with public presentations, forums, economic outlooks, and workshops in areas of interest to the business community. Many of their members maintain State Data Centers and facilitate public access to a wide variety of federal, state, and local data and statistics.

Their website provides a [location service](#) to find local AUBER units which can provide research such as economic studies and impact analyses.

## Conclusion

Post-disaster economic impact studies are helpful in determining economic losses and demonstrating the need for outside aid and resources. This type of study serves a critical function in securing the resources necessary to recover from the event. However, these types of studies should not seek to replace a long-term recovery plan, but should serve to complement one. When pursuing this type of study, it is important to consider the constraints of time and resources raised above. Yet, the intelligence that is gathered from such an exercise will pay off dividends in helping local communities to know how the local economy has been impacted and to chart a course of recovery so the community can move on.

### Examples of Post-Disaster Impact Studies

A Study of the Economic Impact of the Deepwater Horizon Oil Spill (Conducted by GNO, Inc.)  
[http://gnoinc.org/wp-content/uploads/GNO\\_Inc\\_EIS\\_FINAL\\_FINAL\\_Publication.pdf](http://gnoinc.org/wp-content/uploads/GNO_Inc_EIS_FINAL_FINAL_Publication.pdf)

Preliminary Estimates of Impact of Hurricanes Ike and Gustav on Louisiana (Conducted by the state's office of economic development- Louisiana Economic Development)  
<http://www.doa.louisiana.gov/cdbg/dr/PDF/GustavIkeEconomicImpact.pdf>

Additional website links for tools discussed in this chapter:

[BEA RIMS \(https://www.bea.gov/regional/rims/rimsii/\)](https://www.bea.gov/regional/rims/rimsii/)

[REMI \(http://www.remi.com/\)](http://www.remi.com/)

[IMPLAN \(https://implan.com/\)](https://implan.com/)



### Additional reading that you may find helpful

“Assessing Community Impacts of Natural Disasters.” Lindell, Michael and Carla Prater.

[http://www.tc.umn.edu/~blume013/Lindell\\_Prater2003.pdf](http://www.tc.umn.edu/~blume013/Lindell_Prater2003.pdf)

“Economics of Natural Disasters: A Critical Review. Okuyama, Yasuhide.

<http://www.ibcperu.org/doc/isis/14698.pdf>

“The Role of Business in Disaster Response.” US Chamber of Commerce.

<http://bclcl.uschamber.com/sites/default/files/documents/files/Role%20of%20Business%20in%20Disaster%20Response.pdf>

“Natural Hazards, Unnatural Disasters- The Economics of Effective Prevention.” World Bank and United Nations.

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“A Framework for Analyzing the Total Economic Impacts of Terrorist Attacks and Natural Disasters.” Rose, Adam Z., *Journal of Homeland Security and Emergency Management*, Vol 6, Issue 1, Article 9, 2009,

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“Economic Impact of Natural Disasters on Development in the Pacific.” McKenzie, Emily; Prasad, Dr. Biman, Kaloumaria, Atu, Australian Agency for International Development (AusAID), 2006.

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“Wealth and Income Effects of Natural Disasters: An Econometric Analysis of Hurricane Hugo.” Guimaraes, Paulo, Hefner, Frank L., Woodward, Douglas P., Division of Research, College of Business Administration, University of South Carolina, 1992. <http://journal.srsa.org/ojs/index.php/RRS/article/view/23.2.1>

“the Causal Effect of Environmental Catastrophe on Long-run Economic Growth: Evidence from 6,700 Cyclones, Hsiang, Solomon M, Jina, Amir S., National Bureau of Economic Research, July 2014.

<http://www.nber.org/papers/w20352>

“Indicators of Progress: Guidance on Measuring the Reduction of Disaster Risks and the Implementation of the Hyogo Framework for Action.” United Nations, 2008. <http://www.unisdr.org/we/inform/publications/2259>



“Disaster Impact and Unmet Needs Assessment Kit.” CDBG-DR Toolkits, Department of Housing and Urban Development, March, 2013. <https://www.hudexchange.info/resource/2870/disaster-impact-and-unmet-needs-assessment-kit/>

“Tight Coupling, Open Systems, and Losses from Extreme Events.” Alesch, Daniel J. PhD, Holly, James N. PhD, Public Entity Risk Institute, 1999, [http://www.riskinstitute.org/peri/images/file/Alesch\\_Tight\\_Coupling\\_Open\\_Systems\\_and\\_Losses\\_From\\_Extreme\\_Events.pdf](http://www.riskinstitute.org/peri/images/file/Alesch_Tight_Coupling_Open_Systems_and_Losses_From_Extreme_Events.pdf)

“The Northridge Earthquake, USA and its Economic and Social Impacts.” Petak, William J., Elahi, Shirin, EuroConference on Global Change and Catastrophe Risk Management, 2000. <http://resilience.abag.ca.gov/wp-content/documents/resilience/toolkit/The%20Northridge%20Earthquake%20and%20its%20Economic%20and%20Social%20Impacts.pdf>

“Conducting a Community Audit: Assessing the Workforce Development Needs and Resources of Your Community.” US Department of Labor, Employment and Training Administration, Office of Adult Services, August 2000. [http://www.doleta.gov/layoff/pdf/conducting\\_a\\_community\\_audit.pdf](http://www.doleta.gov/layoff/pdf/conducting_a_community_audit.pdf)

“Winners and Losers: Predicting Business Disaster Recovery Outcomes Following the Northridge Earthquake.” Dahlhamer, James M., Tierney, Kathleen J., University of Delaware Disaster Research Center, 1996. <http://dspace.udel.edu/handle/19716/651>

“An Econometric Analysis of the Impact of Terrorism on Tourism.” Enders, Walter, Sandler, Todd, Parise, Gerald F., *Kyklos*, Vol 45, 1992. <http://onlinelibrary.wiley.com/enhanced/doi/10.1111/j.1467-6435.1992.tb02758.x/>

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“Galveston Island Tourism Economic Impact Analysis.” AngelouEconomics, 2008. <http://www.cityofgalveston.org/DocumentCenter/Home/View/215>

“Community Economic Analysis: A How To Manual.” Hustedde, Ronald J., Shaffer, Ron, Pulver, Glen. 1984. <http://www.epa.gov/greenkit/pdfs/howto.pdf>