

Climate Change Vulnerability and Impact Assessments



Abt Associates provides a unique combination of expertise and insight in vulnerability and impact assessments with leading international experts on our staff. We understand **climate change science**, and how it should be used to develop climate change and **socioeconomic scenarios**, and **apply models** to estimate climate change impacts on human and natural systems.

Abt uses vulnerability and impact analyses to support decision-making. Rather than start with climate model output, we recommend that clients identify climate and other variables and the timeframes that need to be addressed to support decision-making. Such a problem-driven orientation helps to cost-effectively focus limited client resources. In many cases, it is not average climate, but climate extremes, which matter most. We help clients frame their information needs to develop effective vulnerability and impact assessments.

Climate change vulnerability assessments (VAs) should include the following elements:

- Climate change scenarios
- Baseline socioeconomic scenarios
- Economic analysis
- Adaptation analysis

Abt has extensive experience and excels in all of these VA areas.

Climate Change and Baseline Scenarios

This is one of the most widely misunderstood and misapplied component of VAs. We know that the climate is changing and will continue to change, most likely at an accelerated rate. But no one can make a reliable forecast of exactly how climate will change. **Climate change scenarios need to cover a wide range of change possibilities, both at regional and local scales. Abt helps clients using VAs understand the full range of potential climate impacts.** We use climate scenario tools such as SimCLIM, and offer clients the clearest



insights to understand the benefits and limitations of bias corrected statistical downscaling and other techniques, such as localized constructed analogue (LOCA) methods. We use these tools to estimate changes in monthly, seasonal, and annual climates, extreme precipitation and heat, and regional sea level rise through the 21st century.

Socioeconomic conditions are likely to change significantly, even dramatically, over time. We advise our clients to consider such changes when they can significantly affect vulnerability. For example, population growth increases the number of people exposed to climate change impacts, while higher per-capita income can give greater financial resources that can be used to adapt to climate change. We use published estimates of changes in population and income from sources such as the U.S. Census Bureau, the United Nations, the World Bank, and the Intergovernmental Panel on Climate Change.

Climate Change Impacts

Abt has developed a wide range of models and tools to estimate and assess climate change impacts. Our in-house experts work with world-renowned academic experts to ensure that these models are defensible and rely on the latest science. Some of the models we have developed include:

Coral Reefs

Our coral model, called COMBO, estimates coral growth and mortality due to higher temperatures and ocean acidity.

Sea Level Rise Inundation

This model estimates the current upland areas likely to be inundated, as well as the population and property/infrastructure at risk from sea level rise and higher storm surges. It also estimates the ecological impacts to wetlands, mangroves, fish and birds from hard protection structures such as dikes and seawalls.

Temperature Mortality

This model estimates changes in mortality risks for individual urban areas. It accounts for increases in heat stress and reductions in cold stress resulting from projected changes in temperature extremes.

Water Supply and Demand

This model estimates the effects of changes in water supply and demand on key users of water such as domestic, industrial, agriculture, hydropower and environmental flows. The model estimates economic losses or gains associated with such changes and can be used to examine adaptations.

Inland Flooding

Abt's national flood model estimates flood damage at the census block level. We use climate change projections to estimate possible changes in future flood damages and are working with communities to address flood risks and adaptation options.

Bridges

This model estimates the number of bridges vulnerable to increases in peak river flows, and the costs of adaptation.

Terrestrial Vegetation, Carbon Storage and Wildfire

Our vegetation model, called MCI, estimates the location and productivity of major types of vegetation. It also estimates the outbreak of wildfires, amount of land burned and carbon emissions.

Recreational Fishing

This model estimates impacts of climate change on recreational fish guilds and monetary values.

Mountain Snowpack

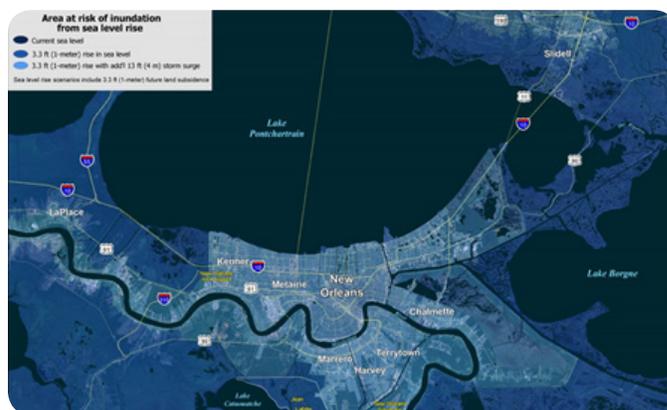
We have simulated changes in mountain snowpack at ski resorts throughout the United States using the Utah Energy Balance (UEB) model. The model can simulate the length of the season and depth of snow.

Economic Analysis

Abt has estimated national-level economic impacts of climate change for the United States and some developing countries. We build on our in-house expertise and leading consultants to estimate what share of national economic output is sensitive to climate change.

Adaptation Analysis

Abt excels in adaptation analysis, and can conduct an analysis or develop an adaptation plan as part of a vulnerability and adaptation assessment, even if a VA is not conducted. We apply analytical techniques to support adaptation decision-making such as benefit-cost analysis, triple bottom line analysis, multi-criteria analysis, and risk analysis. A separate brochure is devoted to describing Abt's capabilities and approach on adaptation.



Contact

For more information on Abt Associates and our work with climate change vulnerability and impact assessments, contact:

Joel Smith
Division of Health & Environment
Joel_Smith@abtassoc.com
303.381.8218

Abt Associates is a mission-driven, global leader in research and program implementation in the fields of health, social and environmental policy, and international development. Known for its rigorous approach to solving complex challenges, Abt Associates is regularly ranked as one of the top 20 global research firms and one of the top 40 international development innovators. The company has multiple offices in the U.S. and program offices in more than 60 countries.

