

Indicator 67. Capacity To Conduct and Apply Research and Development Aimed at Improving Forest Management and the Ability To Predict Impacts on Forests of Possible Climate Change

What Is the Indicator and Why Is It Important?

Capacity to conduct and apply research and development to the problem of predicting climate change impacts involves the development of a good understanding of the impacts of climate change on forests and their disturbances such as pests and fire, the ability to quantify those effects on forest productivity, plant and animal species range shifts, carbon sequestration, water yield, forest health and changes in stand structure, and the ability to integrate impacts across the atmospheric, ecological, and economic systems. Improved understanding of climate change impacts will increase the capability to make better informed and earlier climate change mitigating actions, thus improving the likelihood that forests will be managed on a sustainable basis.

What Does the Indicator Show?

The United States Global Change Research Program, initiated in 1989, has prepared annual reports on the improvements in our knowledge of Earth's global-scale environmental processes and helped to identify and explain the causes and consequences of a series of global environmental changes, including ozone depletion and climate change. This program recently completed the first National Assessment of the Potential Consequences of Climate Variability and Change, which described the projected impacts of climate change and variability in the United States on a regional scale. Accomplishments of this assessment included compilation of 100 years of historical climate

data made available for the wider community of scientists and the public through the Web, as well as projected climate for 100 years under two different climate scenarios. The results of ecological models describing the potential impacts of climate on species shifts and productivity were made available to the wider scientific community and public through the Web, and were used to explore the impact of climate change on the U.S. forest sector.

Improved modeling capability, and hardware and software technology, have increased the use of plot level forest inventory, soils, and land use data as realistic inputs to climate change impact models. This capacity enables a closer examination of the forest's current capacity to store carbon, as well as to produce wood products. Forest production studies have been enhanced by ecological research examining the nature of forest ecosystem processes as affected by climate, increasing atmospheric carbon dioxide, and nutrient cycling. Better data and knowledge on how climate affects disturbances and how forests respond to them would improve our modeling capability. There is a need to better analyze forest practices and community need to adapt to climate change. For example, integrated models of land use and climate are needed to project the interactions of these two influences on biodiversity at local and regional scales. Continued evaluation of climate change impacts is needed on a wide range of forest goods and services including water supply, carbon storage, non-wood forest products, timber, and recreation.