

## The Data Challenge for Research and Policy on Weather, Climate, and Society

Both science and policy require good data. This is particularly true at the intersection of weather, climate, and society. There is widespread recognition in the scientific community that having comparable data over long time periods is essential for detecting, measuring, and understanding change, whether it be climate change, ecological change, or social change—or interactions among the three. Less well recognized, however, is the fact that public policy may also be increasingly dependent upon having access to reliable, scientifically vetted data on the social implications of weather and climate. Because climate and environmental change can be so contentious in the policy arena, and the demands for action are so strong, the public is likely to demand proof that policy proposals are based on evidence provided by scientific data and information.

Given this need, however, the availability of multidecadal data series on weather, climate, and society is highly variable. There are very good data on weather conditions in many countries. In the United States, these data have been collected by the National Weather Service of the National Oceanic and Atmospheric Administration (NOAA) for many decades and they are made publicly available through NOAA's National Climate Data Center (NCDC) for both scientific research and policy use. In other countries, the data are collected by meteorological offices, often under guidelines provided by the World Meteorological Organization (WMO). In many countries, national governments play a significant role in providing continuity in weather data collection and management. A larger issue than national weather data, and one that is less well met, is the need for aggregating these data in global datasets, such as global precipitation data, at regular intervals.

Long-term data on climate can be more difficult to obtain than weather data. Often, these data are first collected in the course of scientific research projects and data collection stops at the end of the project. As a result, the collection of these data reflects the research and analytic needs of specific scientists or projects rather than the broader needs of policy makers or future scientists for sustained observations over time. These research datasets can serve as valuable baselines for further observation and tracking. However, in most countries, the periodic or repeated collection of specific types of climate data defined by a scientific baseline dataset is neither funded nor institutionalized. In the United States, the establishment of a climate services unit by NOAA is a valuable step in this direction.

Finally, data on the social implications of changes in weather and climate pose a different set of problems. Demographic data, agricultural production data, certain types of weather and climate hazard data, and even data on deforestation have often been collected by governments for other purposes and are now available over varying time periods, some quite long. Other types of information can be calculated from these data, such as agricultural sources of methane. There are also new demographic datasets, such as the Center for International Earth Science Information Network's (CIESIN) data on global urban and rural settlement, that will become increasingly useful as they cover more time periods. But there are some types of data—such as energy production and use, insurance expenditures after disasters, or various types of consumption data—that are not in the public sector and often not available for reuse by either scientists or policy makers.

In addition to the lack of necessary data series, many scientists and government officials fear that our current observational capability is declining, and that many data routinely collected in the past will no longer be available in the future. Moreover, because many of the data on the societal implications of changes in weather and climate were collected for other

purposes and have been adapted after initial data collection so that they could be used in this new field, there is a need for scientists and policy makers to identify in advance the social data series they will need on weather, climate, and society.

As this very cursory review of data availability in the study of weather, climate, and society suggests, there are critical data needs in this growing field, only some of which are being met. Both science and policy increasingly need long time series to measure change over time. Data collection and management should be institutionalized so that they do not depend on occasional or project-specific funding of scientific research. Because of the value of scientific judgment in identifying, evaluating, and nurturing multipurpose data series for future research and policy, scientists should be recognized and rewarded for establishing datasets or data collection efforts at the nexus of weather, climate, and society. Collaboration in this work among scientists and governments will not only yield better overtime data collection, but will also enrich both research and policy in the future.

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