6 October 1978, Volume 202, Number 4363 SCIENCE

Archiving Remotely Sensed Data

Since World War II an immense body of data has been obtained by remote sensing techniques. Although intended primarily for military intelligence, these data are an unprecedented resource for systematically studying how human action is changing the earth's environments in a time when these effects are increasing and are often irreversible. Processes of great interest to social and biological scientists and crucial for environmental policy cannot be effectively studied without the synoptic, ongoing records of change these data provide. They are, therefore, a precious and irreplaceable resource.

Deserts, for example, spread as a result of the complicated interplay of a number of processes, including various kinds of human activity. These processes and the ways in which human activity affects them are imperfectly understood. Their study requires repeated observations of such things as vegetation, soils, water, and human settlement and other activity for a large sample of localities. Monitoring for this purpose is now being implemented under the auspices of the United Nations, but its success will depend on the continued accumulation and preservation of the data base derived from remote sensing.

Many other modifications of the biosphere are proceeding rapidly also, with unknown long-term consequences. Long stable ecosystems are being affected in a variety of ways by progressive deforestation, the paving of significant areas of urban watersheds, and the industrialization of agriculture. The problems for which remotely sensed data will be invaluable are proliferating.

A serious threat to this data source arises from the rate at which remotely sensed data are themselves accumulating. The question is now arising of how or whether to preserve them. If thoughtfully drawn plans are not made and implemented soon, this data resource may be destroyed needlessly once its military use has been exhausted.

The problem has two aspects. First, some of the data are in the public domain. Their preservation for future use requires funding, which has not yet been provided, and careful plans for archiving. Second, the greater part of existing remotely sensed data are not in the public domain. The strategic importance of these classified records diminishes with time and will eventually reach the vanishing point. When they become declassified, these data will provide the bulk of the information on which this unparalleled opportunity to study environmental processes rests.

The record suggests that preservation of detailed strategic intelligence files is not often accomplished. Public appeals for their maintenance are awkward, since they are calls for the retention of something whose existence is not acknowledged.

We have arrived at a point, however, where the threats to national and even human existence are no longer largely military in nature. They are coming more and more from the increasing expenditure of energy for peaceful human purposes. What once were long-term processes subject to natural evolutionary constraints are now accelerating rapidly, and natural constraints have been, and continue increasingly to be, altered by human intervention. The vast body of remotely sensed data accumulated since World War II, in both the public and classified domains, is the most important new data source we have for monitoring these processes. Deliberate steps must be taken to ensure that potential benefits vital to our national interest are not wiped out by shortsighted destruction of this burgeoning record.

—CHRISTOPHER L. HAMLIN AND WARD H. GOODENOUGH, *Department of Anthropology, University of Pennnsylvania Museum, Philadelphia 19104*