

HUMAN CAUSES OF GLOBAL CHANGE / 45

moving from a concern with important changes in the environment to the identification of the human activities that most seriously affect those changes. This section describes an accounting system that can help to perform the task and illustrates it with a rough and partial accounting of the human causes of global climate change.

A TREE-STRUCTURED ACCOUNTING SYSTEM

A useful accounting system for the human causes of global change has a tree structure in which properties of the global environment are linked to the major human activities that alter them, and in which the activities are divided in turn into their constituent parts or influences. Such an accounting system is helpful for social science because, by beginning with variables known to be important to global environmental change, it anchors the study of human activities to the natural environment and imposes a criterion of impact on the consideration of research directions (see also Clark, 1988). This is important because it can direct the attention of social scientists to the study of the activities with strong impacts on global change.

Because the connections between global environmental change and the concepts of social science are rarely obvious, social scientists who begin with important concepts in their fields have often directed their attention to low-impact human activities (see Stern and Oskamp, 1987, for elaboration). An analysis anchored in the critical physical or biological phenomena can identify research traditions whose relevance to the study of environmental change might otherwise be overlooked. For example, an examination of the actors and decisions with the greatest impact on energy use, air pollution, and solid waste generation showed that, by an impact criterion, studies of the determinants of daily behavior had much less potential to yield useful knowledge than studies of household and corporate investment decisions or of organizational routines in the context of energy use and waste management (Stern and Gardner, 1981a,b). Theories and methods existed for each subject matter in relevant disciplines such as psychology and sociology, but much of the research attention had been misdirected.

The idea of tree-structured accounting can be illustrated by the following sketch of a tree describing the causes of global climate change.

1. The chief environmental property of concern is the level of greenhouse gases in the atmosphere. The major anthropogenic