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Environmental Assessment: A Pragmatic View

Population growth and supporting technology create the potential for tremendous environmental problems. The major question is how to control human activities so as to maximize societal and individual well-being while minimizing harmful effects on health and the environment. Two kinds of effort are required as a basis for decision-making. One is estimation of the actual risks or effects associated with technological options: this is difficult because of the diversity of potentially harmful anthropogenic agents, the large number of organisms and ecosystems that may be affected, and the complexity of exposure pathways and action mechanisms. The other effort is equally difficult because it involves a value judgment: namely, the judgment of what level of risk is acceptable.

The required action is obvious if gross effects are produced (such as those from thalidomide) or if an agent or process that is of very little real benefit (for instance, cyclamates in soft drinks) is even suspect. A dilemma arises when a highly beneficial activity results in low levels of pollutant exposure which, theoretically, could produce harmful effects that are not detectable epidemiologically or cannot be attributed to the pollutant should they occur in individuals. Exposure to ionizing radiation from diagnostic X-rays or nuclear power is one example; use of saccharin is another. A dilemma also arises if the activity is intertwined with societal habits or the economy. Obvious examples are the health effects that can be related to smoking and to the use of automobiles.

In such dilemmas, the course of action must fall between two extremes. One is to take immediate action when a potentially harmful agent is recognized, disregarding any benefits from its use, the availability of substitutes, or the socioeconomic effects of the action. But such precipitous action often does more harm than good. The other is to defer action until its net effect has been determined. Such deferred action often would not be in time to protect the public.

There are other difficulties, many largely unappreciated by researchers, policy-makers, or the public. One major problem is that the present research effort is inadequate. For example, although $2 billion and 30 years have been spent studying the biological effects of ionizing radiation, acceptable exposure levels are still debated. Chemical pollutants are much more complex and many carry the same potential hazards, such as persistence and delayed carcinogenic effects. Another problem is that once a pollutant has been identified and publicized there is a tendency to reduce its risk to zero before acquiring biological and biomedical knowledge; this can lead to increased or prohibitive costs without commensurate benefits. And there is the problem of deciding which pollutants should receive attention first. To clarify decision-making and deepen public understanding, the following principles are proposed:

1) In every environmental and health assessment, the risk or effect (biological and economic) of a given action should be weighed against the risk or effect of not taking that action.

2) All risks or effects should be expressed in terms of the changes that would be produced in our existing state of well-being.

3) In all estimates of risks or effects, there should be a clear statement of the uncertainties that pertain to the assessment to be used in decision-making.

If these principles are adopted, it should be easier to effectively allocate our national research and engineering resources, to avoid making small risks even smaller while larger risks remain unattended, and to give society time for whatever planned and orderly socioeconomic changes are necessary to meet future conditions.—CYRIL COMAR, *Professor Emeritus, Cornell University, and Director, Environmental Assessment Department, Electric Power Research Institute, Palo Alto, California 94303*