

To consider options and their assessments systematically we used a two-dimensional framework in which individual options and assessments are classified according to what we have called the *targets* and *means* they address. This enables us to delimit the full range of options that might be assessed or otherwise debated and to locate actual options and assessments within that range.

Targets

The *target* of an option or assessment can be defined as the portion of the causal chain of risk that it seeks to alter. We adopt the conventions for the causal chain model that is described in Chapter 1 of this volume, summarized in the introduction to Part III, and employed in the companion Chapter 15 on risk assessment. We overlay on that chain three corresponding targets for options and their assessments:

- *Emission targets*, for measures to reduce demand for the polluting activity (such as energy conservation) and measures to reduce the amount of emissions per unit demand (such as switching to cleaner fuels or installing technologies to capture or destroy pollutants before they are released to the environment);
- *Environment targets*, for measures to remove the pollutant from the environment (such as planting forests to absorb carbon dioxide) or to restore the environment to its prior condition (such as liming of acidified lakes); and
- *Impact targets*, for measures to protect from the changed environment people or things they value (such as employing sunscreens for protection from increased UV radiation), measures to introduce structures or species less vulnerable to a changed environment (such as drought-resistant crops), or measures to compensate people for impacts they experience (such as an acidification fund).

As noted in chapter 1 and the introduction to part III of this volume, these three targets have often been designated in the literature as *prevention*, *offset*, and *adaptation* options, respectively. We found in the course of our research, however, that strong connotations have developed around the use of these latter terms. Options characterized as targeted on *prevention* tended in many circles to be treated as though they were inherently good. In contrast, the labels of *adaptation* and, especially, *offset* acquired for some people such negative connotations as to be virtually unmentionable. This situation developed to such an extreme that we found the label *prevention* being stretched by some to cover all options (for example, building sea walls to prevent impacts) merely to secure the perceived benefits of the classification. As an empirical finding, these naming battles are important and are discussed at the appropriate point later in this and other chapters. As an analytical matter, it seemed worthwhile to adopt a more neutral and descriptive terminology for our classification scheme; hence the three target labels given above.

We also found it helpful to add a fourth classification that we have called

- *Generic targets*, for measures that are intended to change the risk across the above categories (such as general research or institution building).

Means

The *means* dimension of our option classification is intended to address the different ways that things we do as a society can alter our relation to the risk at hand. In principle, most interventions or policies change what people *can* do (through changing capacity for research, monitoring, assessment, negotiation, and implementation), what they *want* to do (through changing concern, awareness, or incentives), or what they are *compelled* to do (through changing the social contract via commands embodied in prohibitions, requirements, or laws). Subdividing these logical categories to reflect certain distinctions that have proven important in the actual management of environmental risks, we developed six analytic categories of means:

- *Capacity: cognitive means*, for measures that address the knowledge base through commitment of resources to research, monitoring, or information dissemination;
- *Capacity: technical means*, for measures that address the physical capacity for responding to the risk (such as material substitutions, pollution control technologies, and tree planting);
- *Capacity: institutional means*, for measures that address the organizational capacity for responding to the risk (such as improving society's ability to perform assessments, forging international conventions, improving the contractual environment, and coordinating programs or activities);
- *Incentives: informational means*, for measures that spread awareness of the risk itself or the consequences of actions (such as research and monitoring programs, information campaigns, and labeling practices);
- *Incentives: market means*, for measures that change the perceived benefits and costs of alternative actions (such as taxes, subsidies, and various other market mechanisms); and
- *Command means*, for measures that commit, require, or prohibit changes in practices (such as bans, standards, limits, and voluntary agreements).

Box 17.1 Options addressed in global environmental risk management: A framework for classification

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