

*When a man does not know what harbor he is making
for, no wind is the right wind.
Seneca, Epistles to Lucilus*

Every physical quantity growing in a finite space must eventually exhibit one of three basic behavior modes: a smooth transition to a steady state, oscillation around an equilibrium position, or overshoot and decline. The World3 model was designed to investigate which of these behavior modes is most likely to characterize the evolution of population and capital on this finite earth and to identify the policies that would increase the probability of an orderly transition to global equilibrium.

Through the process of elaborating the model's feedback loops, we were forced to clarify our assumptions about the causes and consequences of growth. These assumptions about the global system are quantified and discussed in detail in Chapters 2 through 7. The mathematical equations presented in those chapters were necessary to ensure the internal consistency of our assumptions and to test the sensitivity of the model to potential errors in our estimates. The equations also express concepts that may assist future research.

However, the purpose of the project was not to construct an elaborate model: our objective was to increase the sophistication and clarity of mental models. Of course, no one is able to carry in his head all the numbers and functional relationships of World3. Thus it is useful to abstract the basic conclusions of the study that can be comprehended intuitively, so that they can be evaluated as possible additions to the evolving conceptual framework that helps each person interpret and respond to the complex world around him. In this conclusion we will summarize the book's message about the relative stability of alternative systems and indicate the future research required to test, extend, and apply our analysis.

8.1 THE BASIC ASSUMPTIONS AND CONCLUSIONS OF WORLD3

The dominant behavior mode of World3 is caused by three basic assumptions about the population-capital system:

1. The prevailing social value system strongly favors the growth of population and capital. Therefore, these quantities tend to grow unless severely pressed by physical limitations. Their growth is exponential because of the inherent positive feedback nature of industrial production and human reproduction.
2. Feedback signals about the negative consequences of growth are generated by the environmental systems that support population and capital. These signals take the form of pressures against growth, such as diminishing returns to investment in agricultural inputs, the buildup of harmful pollutants, increased development costs for new land, increased resource costs, and less food per capita. The negative feedback signals become stronger as population and capital grow toward environmental limits.